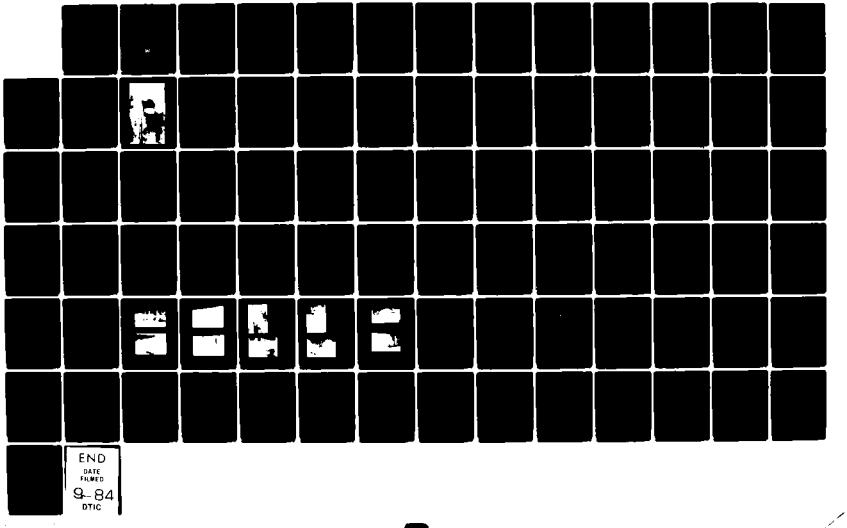
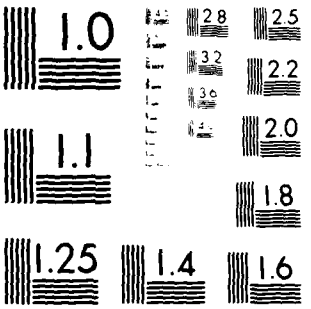
AD-A144 812 NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS 1/1
BLADENS RIVER DAM (CT..(U) CORPS OF ENGINEERS WALTHAM
MA NEW ENGLAND DIV MAR 80

UNCLASSIFIED F/G 13/13 NL



END
DATE FILMED
9-84
DTIC



NAUGATUCK RIVER BASIN
SEYMOUR, CONNECTICUT

BLADENS RIVER DAM
CT 00602

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

MARCH 1980

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00602	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Bladens River Dam NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE March 1980 13. NUMBER OF PAGES 65
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,

Naugatuck River Basin
Seymour, Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Bladens River Dam consists of an earth embankment section, a concrete buttress spillway section, a rubble concrete gravity spillway section, and an intake structure for a downstream forebay. The overall length of the dam is approximately 330 feet and the maximum height is 20 feet. The dam was classified "Small" in size, with a "Significant" potential hazard. The range for the Test Flood of a "Small-Significant" dam is the 100-year flood to ½ the PMF. A test flood equal to ½ the PMF was selected.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF
NEDED

MAY 19 19[illegible]

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the Bladens River Dam Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, The Bridgewater Corporation, Huntington, Connecticut 06584.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

Max B. Scheider

Incl
As stated

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

A1

BLADENS RIVER DAM
CT 00602

NAUGATUCK RIVER BASIN
SEYMOUR, CONNECTICUT

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

49-10

MARCH 1980

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

IDENTIFICATION NO: CT 00602

NAME OF DAM: Bladens River Dam

TOWN: Seymour

COUNTY AND STATE: New Haven County, Connecticut

STREAM: Bladens River

DATE OF INSPECTION: November 29, 1979

BRIEF ASSESSMENT

The Bladens River Dam consists, from left to right, of an earth embankment section, a concrete buttress spillway section, a rubble concrete gravity spillway section, and an intake structure for a downstream forebay. The overall length of the dam is approximately 330 feet and the maximum height is 20 feet.

The earth embankment is approximately 120 feet long, with a maximum height of 20 feet, a top width of 8 feet, an upstream slope of 2 horizontal to 1 vertical, and a downstream slope of 1.7 horizontal to 1 vertical. The centerline of the embankment is oriented almost parallel to the river downstream of the spillway. The concrete buttress spillway section is 53 feet long and has a maximum height of 17 feet above streambed. The Ambursen-type concrete structure consists of an upstream inclined concrete deck supported by the left spillway wall, three vertical buttress walls, and the left end of the gravity spillway section. The left spillway wall consists of a dry stone masonry wall that separates the downstream river channel from the earth embankment. The rubble concrete gravity spillway section is approximately 32 feet long, with a maximum height above

streambed of 17 feet. The right spillway wall is a dry stone masonry wall that separates the forebay from the downstream river channel. The intake structure for the downstream forebay is located at the right abutment and consists of a wood sluice gate approximately 3'0" x 3'0", located on the upstream face of a mortared stone masonry wall that discharges through the wall to a forebay inlet channel with mortared stone masonry walls. The channel from the forebay to an abandoned sluiceway is blocked by an earth fill. Flow through the forebay inlet gate is diverted over an auxiliary spillway in the right wall of the main spillway to the stream below the main spillway. The low level outlet or blowoff gate consists of a manually operated 36-inch sluice gate located between the two extreme right buttress walls of the Ambursen-type spillway section.

The dam does not meet the Corps of Engineers criteria for the "Small" size classification given in the Recommended Guidelines for Safety Inspection of Dams. However, for the purpose of this report the dam was classified "Small" in size, with a "Significant" potential hazard. The range for the Test Flood of a "Small-Significant" dam is the 100-Year Flood to one-half the Probable Maximum Flood (1/2 PMF). A Test Flood equal to 1/2 PMF was selected because of the downstream development. Due to the small size of the impoundment, the Test Flood outflow was assumed to equal the Test Flood inflow of 8,300 cfs and would overtop the low point of the dam crest by approximately 3 feet. The spillway capacity is equal to 940 cfs or 11 percent of the Test Flood.

Based on the visual inspection and hydraulic/hydrologic investigation, the dam is considered to be in poor condition. Features

that can effect the future integrity of the dam are: continued deterioration of the concrete in the spillway sections; continued movement and tilting of the left spillway wall and continued erosion below the adjacent upstream walls; continued movement of the right spillway wall; erosion of the upstream slope of the earth embankment; further loss of mortar and weakening of the forebay inlet channel walls; possible internal erosion along root systems of the trees and vegetation in the masonry walls and in the earth embankment; possible internal erosion resulting from the seepage at the toe of the earth embankment; uprooting of large trees on the earth embankment and right abutment resulting in depressions which reduce the freeboard of the dam; and, inadequate spillway capacity.

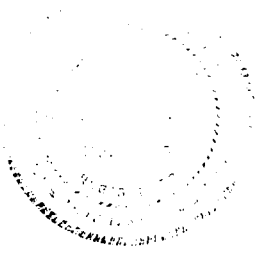
The following items should be investigated by a qualified, registered engineer and corrected as required: the deteriorating concrete spillways; the stability of the left and right spillway walls; the erosion of the upstream slope of the earth embankment; the deterioration of the forebay inlet channel walls; and, the seepage at the toe of the earth embankment. In addition, the trees and vegetation in the masonry spillway walls and in the earthen embankment should be removed. The trees should be removed from the earth embankment by uprooting, and the root zones carefully backfilled as directed by a qualified, registered engineer. A detailed hydrologic/hydraulic analysis should be performed to determine the need for and means to provide additional discharge capacity.

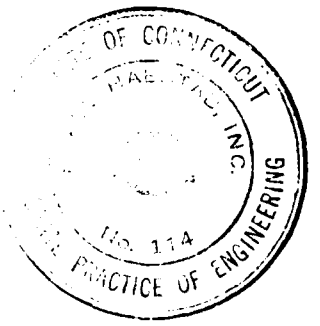
The dam should be inspected by a qualified, registered engineer every year. An operations and maintenance manual should be prepared for the dam and operating facilities, and a formal warning system put into effect. Should the sediments be removed from the impoundment, the low level outlet or blowoff gate should be made operative.

The owner should implement the recommendations as described herein and in greater detail in Section 7 of the Report within one year after receipt of this Phase I Inspection Report.

Donald L. Smith, P.E.
Project Engineer

Roald Haestad
President





This Phase I Inspection Report on Bladens River Dam **has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgment and practice, and is hereby submitted for approval.**

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Richard J. DiBuono

RICHARD DIBUONO, MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, CHAIRMAN
Geotechnical Engineering Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the

condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety of the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

TABLE OF CONTENTS

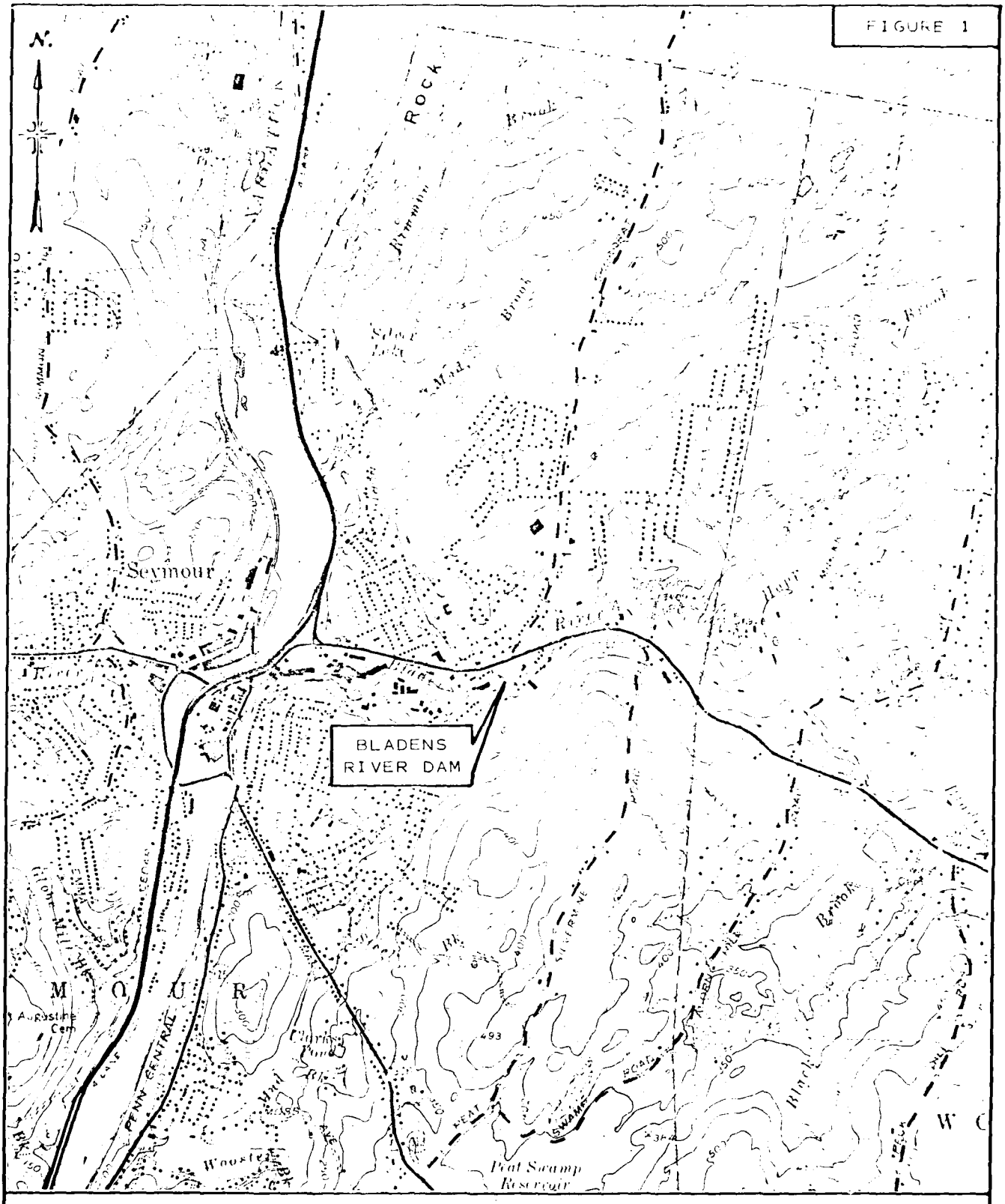
INDEX TO REPORT

INDEX TO APPENDIXES

OVERVIEW PHOTO

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS ROALD HAESTAD, INC CONSULTING ENGINEERS WATERBURY, CONNECTICUT	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM - BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 16 JAN '80

FIGURE 1



LOCATION PLAN

BLADENS RIVER DAM
SEYMOUR, CONNECTICUT

SCALE: 1" = 2000'

ROALD HAESTAD, INC. NAUGATUCK QUADRANGLE 1972

NATIONAL DAM INSPECTION PROGRAM
PHASE I INSPECTION REPORT

PROJECT INFORMATION
SECTION 1

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Roald Haestad, Inc., has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Roald Haestad, Inc. under a letter of November 1, 1979, from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-80-C-0015 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection

The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interest.
2. Encourage and prepare the States to quickly initiate effective dam inspection programs for non-federal dams.
3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project

a. Location

The dam is located on Bladens River approximately 3/4 of a mile east of the confluence with the Naugatuck River just south of Connecticut Route 67 in the Town of Seymour, Connecticut. The dam is shown on the Naugatuck Quadrangle Map having coordinates of latitude N 41° 23.8", and longitude W 73° 03.5".

b. Description of Dam and Appurtenant Structures

The Bladens River Dam consists, from left to right, of an earth embankment section, a concrete buttress spillway section, a rubble concrete gravity spillway section, and an intake structure for a downstream forebay. The overall length of the dam is approximately 330 feet, and the maximum height of the dam above streambed is 20 feet.

The earth embankment section is approximately 120 feet long, with a maximum height of 20 feet, a top width of 8 feet, an upstream slope of 2 horizontal to 1 vertical, and a downstream slope of 1.7 horizontal to 1 vertical. There is no slope protection on the upstream slope. A heavy tree growth is present on the upstream and downstream slopes and on the top of the earth embankment. The centerline of the embankment is oriented almost parallel to the river downstream of the spillway.

The concrete buttress section is 53 feet long and has a maximum height of 17 feet above streambed. The Ambursen-type concrete structure consists of an upstream, inclined concrete deck supported by the left spillway wall, three vertical buttress walls, and the

left end of the gravity spillway section. The spacing between buttress walls is 12 feet, the buttress walls are 12 inches thick, and the upstream concrete deck is on a 45° incline. The left spillway wall consists of a dry stone masonry wall and separates the earth embankment from the downstream river channel.

The rubble concrete gravity spillway section is approximately 32 feet long, with a maximum height of 17 feet above streambed and an unknown cross-section. The right spillway wall is a dry stone masonry wall that separates the forebay from the downstream river channel.

The intake structure for the downstream forebay consists of a wood sluice gate, approximately 3'-0" x 3'-0", located on the upstream face of a mortared stone masonry wall, that discharges through the wall to a forebay inlet channel with mortared stone masonry walls. The forebay is a small pond separated from the downstream river channel by the right spillway wall.

The sluiceway from the forebay to a downstream building is currently not in use. The channel from the forebay to the sluiceway structure is blocked by an earth fill. Flow through the forebay intake gate is diverted over an auxiliary spillway to the stream below the main spillway. The auxiliary spillway is located in the right wall of the main spillway section, and was constructed by removing a section of the top of the stone masonry wall.

The low level outlet or blowoff gate consists of a manually operated 36-inch sluice gate located between the second and third buttress walls from the right.

c. Size Classification - "Small"

According to the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, a dam is classified as "Small" in size if the height is between 25 feet and 40 feet, or the dam impounds between 50 Acre-Feet and 1,000 Acre-Feet. Not included in the inspection program are dams which are 6 feet or less in height regardless of storage capacity, or which have a storage capacity of 15 Acre-Feet or less regardless of height. The original inventory listed the structural height as 34 feet and the maximum storage capacity as 32 Acre-Feet. The dam as field surveyed has a maximum height of 20 feet and a maximum storage capacity of 16 Acre-Feet. Therefore, the dam does not meet the Corps of Engineers' requirements for a "Small" dam. However, for the purpose of this report the dam was classified as "Small".

d. Hazard Classification - "Significant"

Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the hazard classification for the dam is "Significant". A dam failure could result in the loss of a few lives and an economic loss due to the downstream flooding.

A house and one factory are located approximately 400 feet downstream of the dam. The depth of flow in this area prior to dam breach is 3.5 feet above river bed based on a spillway capacity of 940 cfs. The flow in this area due to the dam breach is 9,500 cfs equivalent to a depth of flow of 14 feet, or 2 feet above the factory floor and 6 feet above the cellar of the house. At another factory complex 1,400 feet further downstream, the water levels would increase from 4 feet above the river bed before dam breach to 10.5 feet, or 2 feet deep in the factories, after dam breach.

e. Ownership

Former Owner: The Seymour Paper Mill

Present Owner: The Bridgewater Corporation
303 Isinglass Road
Huntington, Connecticut 06584
(203) 929-8588
Harold Gorman, P.E., President

f. Operator — Michael Gorman (203) 929-8588
The Bridgewater Corporation
303 Isinglass Road
Huntington, Connecticut 06584

g. Purpose of Dam

At the present time the dam serves no useful purpose. The owner is currently investigating the feasibility of utilizing the dam for hydroelectric purposes.

h. Design and Construction History

There is no information available on the design and construction of the dam. The owner believes that the stone masonry portion of the dam and the intake gate to the forebay were constructed around 1845. A date scored into the concrete portion of the spillway indicates that construction took place in 1906.

i. Normal Operational Procedures

As the dam is presently not in use, there are no normal operational procedures.

1.3 Pertinent Data

a. Drainage Area

The drainage area consists of 10.1 square miles of wooded, "rolling" terrain, with scattered residential development.

b. Discharge at Damsite

Discharge at the damsite is over an 85-foot long concrete overflow spillway. A 3'-0" x 3'-0" intake gate is stuck in the open position and allows water to flow into a forebay, where it

discharges over an auxiliary spillway. A 36-inch low level outlet or blowoff sluice gate located in the spillway section is stuck in the closed position.

The maximum known flood since 1973 occurred in January, 1979 when a flow of approximately 18 inches over the spillway was observed.

1.	Outlet Works (conduits) Size:	36 inch*
	Invert Elevation:	161.1
	Discharge Capacity:	140 cfs
2.	Maximum Known Flood at Damsite: (since 1973)	450 cfs (Jan. '79)
3.	Ungated Spillway Capacity at Top of Dam:	940 cfs
	Elevation:	177.5
4.	Ungated Spillway Capacity at Test Flood Elevation:	4,050 cfs
	Elevation:	181.6
5.	Gated Spillway Capacity at Normal Pool Elevation:	N/A
	Elevation:	N/A
6.	Gated Spillway Capacity at Test Flood Elevation:	N/A
	Elevation:	N/A
7.	Total Spillway Capacity at Test Flood Elevation:	4,050 cfs
	Elevation:	181.6
8.	Total Project Discharge at Top of Dam:	940 cfs
	Elevation:	177.5
9.	Total Project Discharge at Test Flood Elevation:	8,350 cfs
	Elevation:	181.6

*Inoperative

c. Elevation - Feet Above Mean Sea Level (NGVD)

1. Streambed at Toe of Dam:	158
2. Bottom of Cutoff:	Unknown
3. Maximum Tailwater:	N/A
4. Recreation Pool:	N/A
5. Full Flood Control Pool:	N/A
6. Spillway Crest:	175
7. Design Surcharge - Original Design:	Unknown
8. Top of Dam:	178.6
9. Test Flood Surcharge:	181.6

d. Reservoir - Length in Feet

1. Normal Pool:	400 feet
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	400 feet
4. Top of Dam:	600 feet
5. Test Flood Pool:	1,100 feet

e. Storage - Acre-feet

1. Normal Pool:	13 Acre-Feet
2. Flood Control Pool:	N/A
3. Spillway Crest Pool:	13 Acre-Feet
4. Top of Dam:	16 Acre-Feet
5. Test Flood Pool:	31 Acre-Feet

f. Reservoir Surface - Acres

1. Normal Pool:	1.3 Acres
2. Flood-Control Pool:	N/A
3. Spillway Crest:	1.3 Acres
4. Test Flood Pool:	4.1 Acres
5. Top of Dam:	1.3 Acres

g. Dam

1.	Type:	120 ft. Earth Embankment 53 ft. Ambursen-type buttress overflow 32 ft. rubble concrete overflow
2.	Length:	330 ft. (including intake structure for downstream factory)
3.	Height:	20 feet
4.	Top Width:	8 ft. (earth embankment)
5.	Side Slopes: (earth embankment)	2 Hor. to 1 ver. - upstream 1.7 Hor. to 1 ver. - downstream
6.	Zoning:	Unknown
7.	Impervious Core:	Unknown
8.	Cutoff:	Unknown
9.	Grout Curtain:	Unknown
10.	Other:	

h. Diversion and Regulating Tunnel - N/A

i. Spillway

1. Type:	Rubble concrete gravity overflow(32 ft.), Amburson-type buttress overflow (53 ft.)
2. Length of Wier:	85 feet
3. Crest Elevation with Flashboards: without Flashboards:	 N/A 175
4. Gates:	N/A
5. Upstream Channel:	N/A
6. Downstream Channel:	Natural streambed of Bladens River
7. General:	Buttress wall spacing 12 ft.; wall thickness 12 in.

j. Regulating Outlets

1. Invert:	161.1
2. Size:	36-inch
3. Description:	36-inch conduit through inclined slab of buttress spillway section, with downstream sluice gate
4. Control Mechanism:	Manually operated from inside compartment of buttress spillway section
5. Other:	Impoundment is presently filled with silt and gate is inoperative

ENGINEERING DATA

SECTION 2

2.1 Design Data

There was no design data available for review.

2.2 Construction Data

There was no information available on the construction of the dam. The owner believes the stone masonry section near the intake gate to the forebay was constructed around 1845. A date etched into the concrete portion of the spillway indicates construction in 1906.

2.3 Operation Data

Since 1973 the maximum known flow over the spillway occurred in January 1979 when a flow of approximately 18 inches over the spillway was observed.

2.4 Evaluation of Data

a. Availability

There was no design or construction data available from either the State of Connecticut, Department of Environmental Protection, the owner, or the Town of Seymour.

b. Adequacy

As no design or construction data was available, the assessment of the dam was based on the visual inspection, past performance history and hydraulic and hydrologic calculations.

VISUAL INSPECTION

SECTION 3

3.1 Findings

a. General

The visual inspection of the dam was conducted on November 29,1979. The inspection team was accompanied by Mr. Michael Gorman of the Bridgewater Corporation, the owner of the dam. Approximately 0.1 feet of water was flowing over the spillway at the time of the inspection. Water was also flowing over the auxiliary spillway of the forebay. At the time of the inspection the dam was judged to be in poor condition.

The dam consists, from left to right, of an earth embankment section, Photo 1; a concrete spillway section, Photo 2; and an intake structure for a downstream forebay.

b. Dam

Spillway Section

The overflow spillway has a total length of 85 feet. The left section of the spillway is a 53-foot long Ambursen-type concrete buttress structure, and the right section is a 32-foot long rubble concrete gravity structure, Photo 2. The Ambursen-type spillway section is composed of an upstream, inclined concrete deck supported by the left spillway wall, three vertical buttress walls, and the left end of the gravity spillway section. Thus, from downstream, one can observe four open compartments under the concrete deck, Photo 2. The downstream face of the gravity section appears to consist of rubble concrete which may have been faced with gunite, Photo 2.

Significant concrete deterioration was observed along the entire length of the spillway crest of both sections, Photos 2 and 3. Areas of particularly severe concrete deterioration of the spillway crest were observed above the concrete buttress walls, Photos 3 and 4, and at the left spillway wall, Photos 5 and 6. At the left spillway wall the deterioration was so severe that water was flowing around the edge of the spillway lip as shown in Photo 5. In the buttress spillway sections, significant concrete deterioration was observed at the tops and bases of the buttresses, Photos 3 and 4. This deterioration was most severe at the top of the rightmost buttress where reinforcing bars were exposed in several places and where there was a gap between the concrete at the top of the buttress and at the bottom of the downstream end of the deck, Photo 2; and at the base of the center buttress where the downstream end of the buttress wall was undermined. The conditions of the underside of the concrete deck varied from good, with minor efflorescence in the far right compartment, to poor, with deteriorated concrete, exposed reinforcing steel and seepage in the left compartment, Photo 4.

In the gravity spillway section some concrete deterioration was observed on the downstream face, as shown in Photo 2.

The left spillway wall is a dry stone masonry wall, as shown in Photo 7. Past movement of the left spillway wall was indicated by 1) generally open joints between the blocks in the wall, 2) a vertical crack in the stone masonry, Photo 7, 3) tilting of the top of the wall toward the river, Photo 7, and 4) separation between the upstream end of the wall and the edge of the spillway, Photos 5 and 6. Some vegetation was observed growing out of the left

spillway wall. Some evidence of seepage in the form of rust staining on the masonry was observed at the base of the wall, downstream of the spillway.

To the left of the spillway there is an upstream wall which is undermined to distances up to 12 inches behind the face of the wall, as shown in Photo 6. The concrete facing on the wall appears to have been added after previous downstream movements of the wall, Photo 5.

The right spillway wall is a dry stone masonry wall and has an opening which constitutes the auxiliary spillway, Photo 8. Past movement of the wall is suggested by the generally open nature of the joints between the blocks in the wall, Photo 8. Some vegetation was observed growing out of the right spillway wall.

Earth Embankment Section

The earth embankment section of the dam is approximately 120 feet long and is located between the left spillway wall and the left abutment. The centerline of the embankment is oriented almost parallel to the stream channel downstream of the spillway. Heavy tree growth was observed on the crest and the upstream and downstream slopes of the embankment, Photo 1. On the upstream slope a nearly vertical scarp exists at the upstream edge of the crest. Several large trees were observed growing out of this scarp, Photo 1. Some seepage with rust staining was observed at the toe of the downstream slope.

c. Appurtenant Structures

The appurtenant structures consist of 1) a forebay for an abandoned sluiceway and 2) a low level outlet or blowoff gate in the spillway section of the dam.

The forebay is located to the right of the right spillway wall and contains an inlet channel and gate structure and an auxiliary overflow spillway. The inlet gate is reported to be a wood gate stuck in the open position. The channel from the forebay to the abandoned sluiceway is blocked by an earth fill and the flow through the inlet gate is diverted over the auxiliary spillway to the stream channel below the main spillway.

The forebay inlet channel is located downstream of the inlet gate and has mortared stone masonry walls, as shown in Photo 9. In many of the joints the mortar was missing or badly deteriorated. Three trees were observed growing out of the downstream end of the right wall of the inlet channel, Photo 9.

The auxiliary spillway is located in the right wall of the spillway section of the dam and was constructed by removing a section of the top of the stone masonry wall, Photo 8.

The low level outlet or blowoff gate is a 36-inch diameter sluice gate located in the Ambursen-type buttress spillway section, Photo 3, and is reported to be stuck in the closed position. Some leakage was observed at the bottom of the gate.

d. Reservoir Area

Siltation of the reservoir has occurred up to practically the crest of the spillway, Photo 2, resulting in an earth pressure loading on the upstream side of both the Ambursen-type spillway and the gravity spillway.

There are no indications of instability along the edges of the reservoir in the vicinity of the dam.

e. Downstream Channel

The spillway sections of the dam and the auxiliary spillway of the forebay discharge into the natural streambed of the Bladens River. Bedrock outcrops were observed in the streambed at the right side of the dam, as shown in Photo 10.

3.2 Evaluation

Based on the visual inspection the dam is judged to be in poor condition. The following conditions could effect the integrity of the dam:

1. Continuation of the concrete deterioration in both spillway sections and the increased load due to reservoir siltation could lead to a structural failure of the dam.
2. Continued movement and tilting of the left spillway wall and erosion below the adjacent upstream wall could result in partial or complete failure of this wall which could produce a dam breach.
3. Continued movement of the right spillway wall could result in partial or complete failure of this wall which could produce a breach in the dam.
4. Continued erosion of the upstream slope of the earth embankment section of the dam could breach the dam.
5. Continued loss of mortar and resultant weakening of the forebay inlet walls could cause failure of those walls which could lead to erosion around the inlet gate.
6. The root system of the trees and vegetation in the masonry spillway walls, forebay inlet walls and in the earth embankment section of the dam could provide channels for the future development of internal erosion.

7. The seepage at the toe of the earth embankment section of the dam could in the future produce internal erosion of the dam.

8. The large trees at the right abutment and the earth embankment could uproot during a storm, resulting in a depression which would reduce the freeboard of the dam.

OPERATIONAL AND MAINTENANCE PROCEDURES

SECTION 4

4.1 Operational Procedures

a. General

At the present time the dam serves no useful purpose. Therefore no operational procedures are in effect. The current owner is investigating the feasibility of utilizing the dam for hydroelectric purposes.

b. Description of Any Warning System In Effect

There is no formal warning system in effect.

4.2 Maintenance Procedures

a. General

The owner has recently removed trees from portions of the dam. The auxiliary spillway for the forebay was lowered by removing stones from the wall to accommodate low stream flows.

b. Operating Facilities

An earth fill has been placed in front of the intake to the sluiceway leading to the forebay. The owner has tried unsuccessfully to open the low level outlet.

4.3 Evaluation

The present operational and maintenance procedures are inadequate. An operations and maintenance manual for the dam and operating facilities should be prepared. The dam should be inspected annually by a qualified, registered engineer.

A formal warning system should be put into effect and should include monitoring of the dam during heavy rains, and procedures for notifying downstream authorities.

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

SECTION 5

5.1 General

The Bladens River Dam has a tributary watershed of 10.1 square miles of wooded, "rolling" terrain with scattered residential development.

The dam has an 85-foot long spillway consisting of a concrete gravity section and an Ambursen Buttress section. The average crest height of the dam is 3 feet above spillway with a low point in the earth embankment, 2.5 feet above spillway. The spillway has a capacity of 940 cfs before overtopping the embankment.

A wooden sluice gate at the right abutment is stuck partially open. This allows water to enter the forebay, where it is diverted back to the river channel via an auxiliary spillway. The gate is approximately 3'-0" x 3'-0". The gate can discharge all of the dry weather flows during most of the summer. A 36-inch cast iron low level outlet or blowoff gate is located in the buttress section of the dam. The owner reported the gate to be inoperative.

A 36-inch reinforced concrete pipe used to transport water from the forebay to the factory below the dam. The channel from the forebay to the intake for the sluiceway is blocked by an earth fill.

5.2 Design Data

No information could be found relating to the design of the dam or the spillway.

5.3 Experience Data

The highest water level observed by the present owner occurred in January 1979 when a depth of 18-inches was recorded going over the spillway. These observations date back only to 1973.

5.4 Test Flood Analysis

Based on the dam failure analysis, the dam is classified as "Significant" hazard potential. The 20 foot height and 16 Acre-Feet storage capacity are below the requirements for even a small dam. The 16 Acre-Feet storage capacity was calculated assuming the pond was dredged out. The pond is currently filled with sediment to above spillway level in many places. For purposes of selecting a Test Flood, the dam was classified as "Small - Significant". Based on the Corps of Engineers' Recommended Guidelines for Safety Inspection of Dams, the spillway Test Flood should be in the range of the 100-Year Flood to one-half the Probable Maximum Flood (1/2 PMF) depending on the involved risk.

A Test Flood equal to 1/2 PMF was selected because of the downstream development. A peak rate of runoff of 825 cubic feet per second per square mile (csm) from the guide curve for "rolling" terrain supplied by the Corps of Engineers was used along with the watershed area of 10.1 square miles to arrive at the 1/2 PMF of 8,300 cfs. The initial water level was assumed at spillway level. The impoundment is too small to affect the flood peak so that inflow is equal to outflow. The calculated spillway capacity of 940 cfs before overtopping the low point of the embankment is equal to 11 percent of the Test Flood. The low level outlet is inoperative and because of its location under the buttress section of the dam it cannot be reached in an emergency. The wood sluice gate is considered to have a negligible capacity compared to the Test Flood.

The spillway of this dam is judged to be inadequate. Overtopping of the dam could occur in the future. Further investigations are required to determine the need for and means to provide additional discharge capacity.

5.5 Dam Failure Analysis

A dam failure analysis was made using the "Rule of Thumb" guidance provided by the Corps of Engineers. Failure was assumed when the water level reached the top of the dam.

A breach of the dam would release up to 13,200 cfs into the stream channel below the dam. It should be noted that a flow of this magnitude would empty the pond in less than one minute.

The area of prime impact is the factory 400 feet downstream of the dam and the house across the river from the factory. The factory is owned by the Bridgewater Corporation, owner of the dam. Water depth prior to failure would be 3.5 feet above river bed based on a spillway capacity of 940 cfs. The flood wave at the factory and house would have a depth of over 14 feet and a flow of 9,500 cfs. Water depth in the factory would be about 2 feet. The house has a finished basement exposed to the river channel and would be flooded to a depth of about 6 feet above the cellar floor.

There is another large factory complex about 1,400 feet further downstream. The flood wave would cause water depths of about 2 feet in two of the factory buildings. Water levels would be 4 feet above river bed prior to failure and 10.5 feet at failure. Peak flood flow would be 3,700 cfs. Below this point the flood wave would be confined to the river channel.

The dam is classified as "Significant" hazard potential. A dam failure could result in the loss of a few lives and an economic loss due to the flooding of the factories.

The dam breach calculations are shown in Appendix D.

EVALUATION OF STRUCTURAL STABILITY

SECTION 6

6.1 Visual Observations

The tilting and apparent past movements of the left spillway wall suggest that it may be only marginally stable at present.

Siltation of the reservoir has occurred practically up to the crest of the spillway resulting in an earth pressure loading on the upstream side of the spillway sections.

The future integrity of the dam could be affected by continued deterioration of the concrete spillway sections, continued movement of the left and right spillway walls, erosion of the upstream slope of the earth embankment, and possible internal erosion along the root systems of trees or resulting from seepage.

6.2 Design and Construction Data

There was no design or construction data available.

6.3 Post-Construction Changes

No known post construction changes have been made which might jeopardize the integrity of the dam.

6.4 Seismic Stability

The dam is located in Seismic Zone I, and in accordance with the recommended Phase I Inspection Guidelines does not warrant seismic analysis.

ASSESSMENT, RECOMMENDATIONS, & REMEDIAL MEASURES
SECTION 7

7.1 Dam Assessment

a. Condition

On the basis of the visual inspection, the dam is judged to be in poor condition. The future integrity of the dam could be affected by the following:

1. Continued deterioration of the concrete in the spillway sections, and the increased load due to reservoir siltation.
2. Continued movement and tilting of the left spillway wall and continued erosion below the adjacent upstream wall.
3. Continued movement of the right spillway wall.
4. Continued erosion of the upstream slope of the earth embankment section of the dam.
5. Further loss of mortar and resultant weakening of the forebay inlet walls.
6. Possible future internal erosion along root systems of the trees and vegetation in the masonry spillway walls and in the earth embankment section of the dam.
7. Possible future internal erosion resulting from the seepage at the toe of the earth embankment section of the dam.
8. The large trees at the right abutment and earth embankment could uproot during a storm, resulting in a depression which would reduce the freeboard of the dam.

The evaluation of Hydraulic/Hydrologic features of the dam indicates that the spillway is capable of passing 11 percent of the

Test Flood before overtopping of the low point of the earth embankment occurs. The earth embankment would be overtopped by approximately 3 feet due to the Test Flood.

b. Adequacy of Information

There was no design and construction information available and thus the assessment of the condition of the dam is based solely on the visual inspection and past performance history of the dam.

c. Urgency

The recommendations presented in Section 7.2 and 7.3 should be carried out within one year after receipt of this report by the owner.

7.2 Recommendations

The following recommendations should be carried out under the direction of a qualified, registered engineer:

1. The deteriorating concrete spillways should be examined and necessary repairs made. Consideration should be given to the increased loading due to reservoir siltation.
2. The left spillway wall should be investigated and remedial measures to increase the stability of the wall and prevent undermining of the adjacent upstream wall should be designed and constructed.
3. The right spillway wall should be investigated and remedial measures to retard the movements of the wall should be designed and constructed.
4. The erosion of the upstream slope of the earth embankment section of the dam should be investigated and appropriate slope protection should be designed and constructed.

5. The forebay inlet walls should be investigated and remedial measures performed, as necessary.

6. The trees and vegetation in the masonry spillway walls and in the earth embankment section of the dam should be removed. The trees should be removed by uprooting and the root zones carefully backfilled with selected soil, placed as directed by the engineer.

7. The seepage at the toe of the earth embankment section of the dam should be investigated and seepage control measures should be designed and constructed, as necessary.

8. A detailed hydrologic/hydraulic analysis should be performed to determine the need for and means to provide additional discharge capacity.

7.3 Remedial Measures

a. Operation and Maintenance Procedures

1. Technical inspections by qualified, registered engineers should be made every year.

2. A formal operations and maintenance manual for the dam and operating facilities should be prepared.

3. A formal warning system should be put into effect and should include monitoring of the dam during heavy rains and procedures for notifying downstream authorities in the event of an emergency.

4. The large tree at the right abutment should be removed to eliminate the possibility of uprooting. If the forebay is excavated in the future, the removal of the tree stump should be investigated to determine if the root system could lead to possible internal erosion.

5. The low level outlet or blowoff should be made operative when sediments are removed from the impoundment.

7.4 Alternatives

An alternative to the above recommendations is to remove the dam.

APPENDIX A

VISUAL CHECK LIST WITH COMMENTS

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT: Bladens River Dam

DATE: 11/29/79 TIME: 8:30 a.m. WEATHER: Clear, Cold

W.S. ELEVATION: 175.1 U.S. N/A DN.S
0.1 above spillway

	PARTY	DISCIPLINE
1.	Donald L. Smith, P.E. - Roald Haestad, Inc.	Civil/Hydrologist
2.	Ronald G. Litke, P.E. - Roald Haestad, Inc.	Civil Engineer
3.	Gonzalo Castro, Ph.D., P.E. - Geotechnical Engineers, Inc.	Geotechnical Engineer
4.	John W. France, P.E. - Geotechnical Engineers, Inc.	Geotechnical Engineer
5.	Michael Gorman - Bridgewater Corporation	Owner's representative
6.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Spillway Sections of Dam	GC,JWF	Deteriorated concrete
2.	Outlet Works - Spillway Weir, Appr. & Disch.	GC,JWF RGL,DLS	Deteriorated concrete
3.	(Forebay) Outlet Works - Intake Channel & Structure	GC,JWF RGL,DLS	Fair - mortar deteriorated or missing in stone masonry
4.	(Forebay) Outlet Works - Outlet Structure & Channel	GC,JWF RGL,DLS	Stone masonry deteriorated
5.	Dam Embankment	GC,JWF	Irregular with trees on embankment, upstream erosion
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT: Bladen River Dam DATE: 11/29/79

PROJECT FEATURE: Spillway Sections of Dam NAME: GC

DISCIPLINE: Geotechnical NAME: JWF

AREA EVALUATED	CONDITIONS
SPILLWAY SECTIONS OF DAM	
CREST ELEVATION	175 (spillway crest)
CURRENT POOL ELEVATION	175.1
MAXIMUM IMPOUNDMENT TO DATE	176.5 (Since 1973)
SURFACE CRACKS	N/A
PAVEMENT CONDITION	N/A
MOVEMENT OR SETTLEMENT OF CREST	None observed
LATERAL MOVEMENT	None observed
VERTICAL ALIGNMENT	Good
HORIZONTAL ALIGNMENT	Good
CONDITIONS AT ABUTMENT AND AT CONCRETE STRUCTURES	1) deteriorated concrete in spillway sections. 2) Apparent movement and tilting of left spillway wall. 3) Apparent movement of right spillway wall.
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	N/A
TRESPASSING ON SLOPES	N/A
VEGETATION ON SLOPES	Some vegetation growing from spillway walls
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	Erosion and undermining of upstream wall adjacent to the left spillway wall
ROCK SLOPE PROTECTION - RIPRAP FAILURE	N/A
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
UNUSUAL EMBANKMENT OR DOWNSTREAM SEEPAGE	Rust stained seepage at base of left spillway wall downstream of spillway
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None known or observed
TOE DRAINS	None known or observed
INSTRUMENTATION SYSTEM	None known

PERIODIC INSPECTION CHECK LIST

PROJECT: Bladen River Dam DATE: 11/[illegible]

PROJECT FEATURE: Outlet Works - Spillway Weir, Approach & Discharge Channel NAME: GC, JWI

DISCIPLINE: Geotechnical/Civil NAME: FGI, JLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
A. APPROACH CHANNEL:	Under water, not observed
GENERAL CONDITION	
LOOSE ROCK OVERHANGING CHANNEL	
TREES OVERHANGING CHANNEL	
FLOOR OF APPROACH CHANNEL	
B. WEIR AND TRAINING WALLS:	
GENERAL CONDITION OF CONCRETE	Some areas good (portion of right buttress compartment), others poor (crest at buttress and left wall)
RUST OR STAINING	Rust staining present at some joints
SPALLING	Many areas of deterioration and spalling
ANY VISIBLE REINFORCING	Right buttress and bottom of deck near crest - left compartment
ANY SEEPAGE OR EFFLORESCENCE	Varies from minor in right compartment to visible seepage in left compartment
DRAIN HOLES	N/A
C. DISCHARGE CHANNEL:	
GENERAL CONDITION	Good
LOOSE ROCK OVERHANGING CHANNEL	None observed
TREES OVERHANGING CHANNEL	None observed
FLOOR OF CHANNEL	Natural streambed. Bedrock outcrops on one side.
OTHER OBSTRUCTIONS	One large log downstream. Some loose rock in downstream channel

OTHER:

Sluice gate for low level outlet stuck in closed position, leaking slightly.

PERIODIC INSPECTION CHECK LIST

PROJECT: Bladens River Dam DATE: 11/29/79

PROJECT FEATURE: Outlet Works - and Structure (Forebay) Intake Channel NAME: GC,JWF

DISCIPLINE: Geotechnical/Civil NAME: RGL,DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE	
A. APPROACH CHANNEL:	Forebay approach channel located downstream of inlet gate
SLOPE CONDITIONS	Stone masonry walls with missing and deteriorated mortar
BOTTOM CONDITIONS	Not observed, under water
ROCK SLIDES OR FALLS	None observed
LOG BOOM	N/A
DEBRIS	N/A
CONDITION OF CONCRETE LINING	N/A
DRAINS OR WEEP HOLES	
B. INTAKE STRUCTURE:	
CONDITION OF CONCRETE	Stone masonry walls with missing and deteriorated mortar
STOP LOGS AND SLOTS	N/A

OTHER:

Intake gate reportedly stuck in open position.

PERIODIC INSPECTION CHECK LIST

PROJECT: Bladens River Dam DATE: 11/29/79

PROJECT FEATURE: Outlet Works - Outlet Structure and Channel (Forebay) NAME: GC,JWF

DISCIPLINE: Geotechnical/Civil NAME: RGL,DLS

AREA EVALUATED	CONDITIONS
OUTLET WORKS - OUTLET STRUCTURE AND OUTLET CHANNEL	Forebay outlets through an auxiliary spillway into streambed downstream of main spillway section
GENERAL CONDITION OF CONCRETE	N/A
RUST OR STAINING	N/A
SPALLING	N/A
EROSION OR CAVITATION	Stone masonry deteriorated
VISIBLE REINFORCING	N/A
ANY SEEPAGE OR EFFLORESCENCE	N/A
CONDITION AT JOINTS	None observed, but there are openings observed in stone masonry
DRAIN HOLES	Natural streambed. Rock outcrops observed in right side of streambed
CHANNEL	One large log downstream. Some loose rock downstream
LOOSE ROCK OR TREES OVERHANGING CHANNEL	Good
CONDITION OF DISCHARGE CHANNEL	

OTHER:

Intake to abandoned sluiceway blocked by an earth fill.

PERIODIC INSPECTION CHECK LIST

PROJECT: Bladens River Dam DATE: 11/29/79

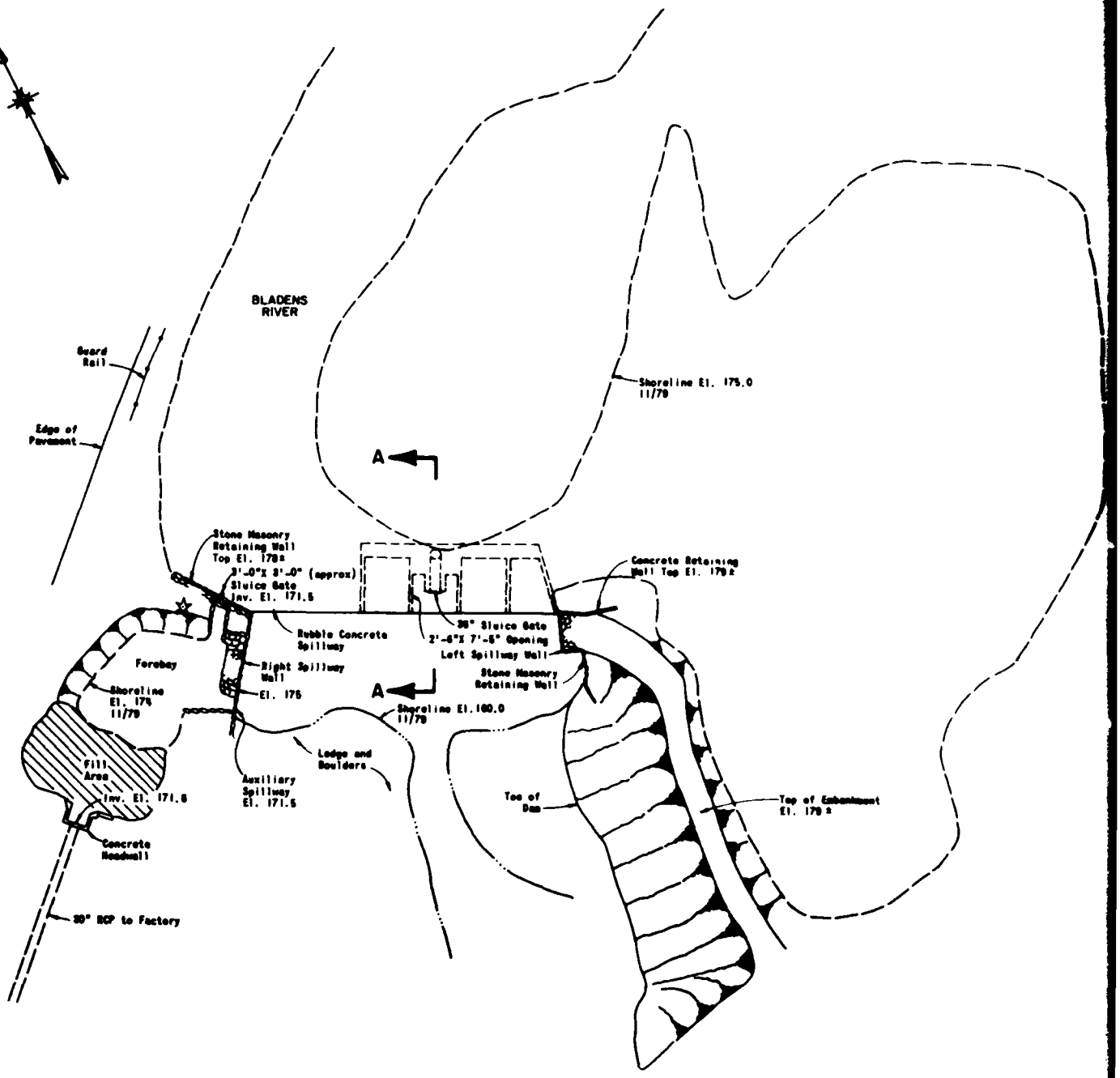
PROJECT FEATURE: Dam Embankment NAME: GC

DISCIPLINE: Geotechnical Engineer NAME: JWF

AREA ELEVATION	CONDITIONS
DAM EMBANKMENT	
CREST ELEVATION	
CURRENT POOL ELEVATION	175.1
MAXIMUM IMPOUNDMENT TO DATE	176.5 (since 1973)
SURFACE CRACKS	None observed
PAVEMENT CONDITION	N/A
MOVEMENT OR SETTLEMENT OF CREST	Too irregular to judge
LATERAL MOVEMENT	Too irregular to judge
VERTICAL ALIGNMENT	Too irregular to judge
HORIZONTAL ALIGNMENT	Too irregular to judge
CONDITION AT ABUTMENT AND AT CONCRETE STRUCTURES	Good
INDICATIONS OF MOVEMENT OF STRUCTURAL ITEMS ON SLOPES	N/A
TRESPASSING ON SLOPES	None observed
VEGETATION ON SLOPES	Heavy tree growth on entire embankment
SLOUGHING OR EROSION OF SLOPES OR ABUTMENTS	Erosion of top of upstream slope creating a near vertical scarp
ROCK SLOPE PROTECTION - RIPRAP FAILURES	No slope protection observed
UNUSUAL MOVEMENT OR CRACKING AT OR NEAR TOES	None observed
EMBANKMENT OR DOWNSTREAM SEEPAGE	Rust stained seepage observed at downstream toe
PIPING OR BOILS	None observed
FOUNDATION DRAINAGE FEATURES	None known or observed
TOE DRAINS	None known or observed
INSTRUMENTATION SYSTEM	None known

APPENDIX B

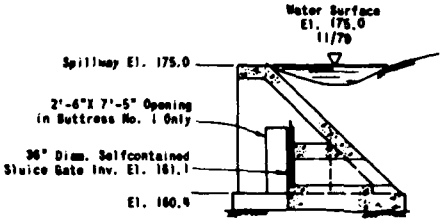
ENGINEERING DATA



PLAN

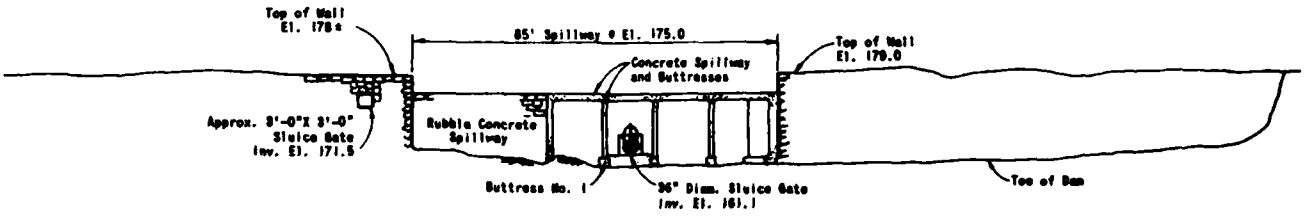
Scale 1"=40'

FIGURE 2



SECTION A-A

Scale 1"=20'



PROFILE

Scale 1"=40'

ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS			
BLADENS RIVER DAM			
DRAWN	CHECKED	APPROVED	SCALES AS NOTED
JRS	DLS		DATE FEB 1980 PAGE B-1

2

LIST OF REFERENCES

All references are located at the Department of Environmental Protection, Office of The Superintendent of Dams, State Office Building, Hartford, Connecticut 06115.

1. Letter Request to the Connecticut Department of Environmental Protection from First Selectman of the Town of Seymour, Connecticut, for inspection of the dam, dated March 4, 1976.
2. Letter Report, "Inspection Report - Dam on the Bladens River, Seymour - Dam Inventory No. S-4", by Robert E. Sonnichsen, dated April 30, 1976.
3. Letter from Seymour First Selectman to Connecticut Department of Environmental Protection, indicating owner of dam as Bridgewater Corporation, P.O. Box 2070, Huntington, Connecticut 06484, dated June 21, 1976.
4. Letter from the Connecticut Department of Environmental Protection to the Bridgewater Corporation, dated June 30, 1976, requesting an engineering evaluation of the dam and submission of a report within 60 days.
5. Letter from the Connecticut Department of Environmental Protection to Bridgewater Corporation, dated November 4, 1976, stating no report had been recieved and that a formal order would be issued if a report was not received within two weeks.

Interdepartment Message

STO-201 REV. 3/73 STATE OF CONNECTICUT

SAVE TIME. *Handwritten messages are acceptable*
Use carbon if you really need a copy. If typewritten, ignore faint lines

To	NAME: File	TITLE:	DATE: 30 April 1974
	AGENCY: Water Resources Unit	ADDRESS:	
From	NAME: Robert E. Sonnichsen	TITLE: Engineer Intern	TELEPHONE:
	AGENCY: Environmental Protection	ADDRESS:	

SUBJECT

Inspection Report - Dam on Bladens River, Seymour - Dam Inventory No. S-4

The subject dam has been inspected twice within the last month at the request of the Town of Seymour.

The structure is partially concrete buttress and partially dry stone masonry. Portions of the dry stone masonry have been gunited to give it the appearance of concrete, but weathering reveals that, in fact, the original masonry exists under the gunite. Original dry stone masonry exists uncovered on both wing walls and on the sluiceway overflow spillway. The dam's sluiceway has been filled and all water leaking through the sluiceway entrance gate returns to the river channel by way of the overflow spillway.

The concrete work on the spillway and both abutments shows signs of deterioration. It appears to be normal weathering. Areas where flow has been concentrated along the base of the southern abutment and some sections of the top of the buttress show most severe deterioration. The concrete on the spillway could not be inspected in more depth than a visual inspection because of the large quantity of flow. Concrete on the south abutment was in relatively sound condition.

The pond area has been filled with a large quantity of silt. The depth of water upstream of the spillway was approximately two feet. The silt appeared to be rather coarse grained gravely sand. No subsurface examination of the silt was performed.

The presence of the silt on the upstream face of the buttress section of the dam has certainly increased the loadings on the dam. Generally, design of a structure of this type includes a conservative factor of safety to compensate for the many unknown factors involved upon construction. No plans or specifications for design of the particular structure are available to this office, but it is the opinion of the engineering staff that the increase in loading due to the presence of the silt blanket on the upstream face of the buttress section of the dam should not surpass the factor of safety included in its construction design. Therefore, the spillway section of this dam is not considered to be in an unsafe condition.

South of the spillway section of the dam, an earth embankment section extends approximately 75 feet. The earth embankment section ties into a steep bank at its end. The embankment wall is extremely steep sloped (approximately $1\frac{1}{2}/1$) and has a substantial number of large trees growing from it. An investigation of the base of the embankment revealed that it was saturated and seepage flows existed. Many of the stones at the base of the embankment were covered by rust colored iron bacteria which is often present in the vicinity of earth embankment seepage areas. This earth

embankment slope appeared to be the least stable section of the dam. Although the seepage and saturation of the base of the embankment slope did not appear to place the dam in immediate danger of failure, I believe that it should be repaired by reinforcing its downstream slope with a relatively pervious fill. The silt deposit from the pond bottom may be suitable material for this use.

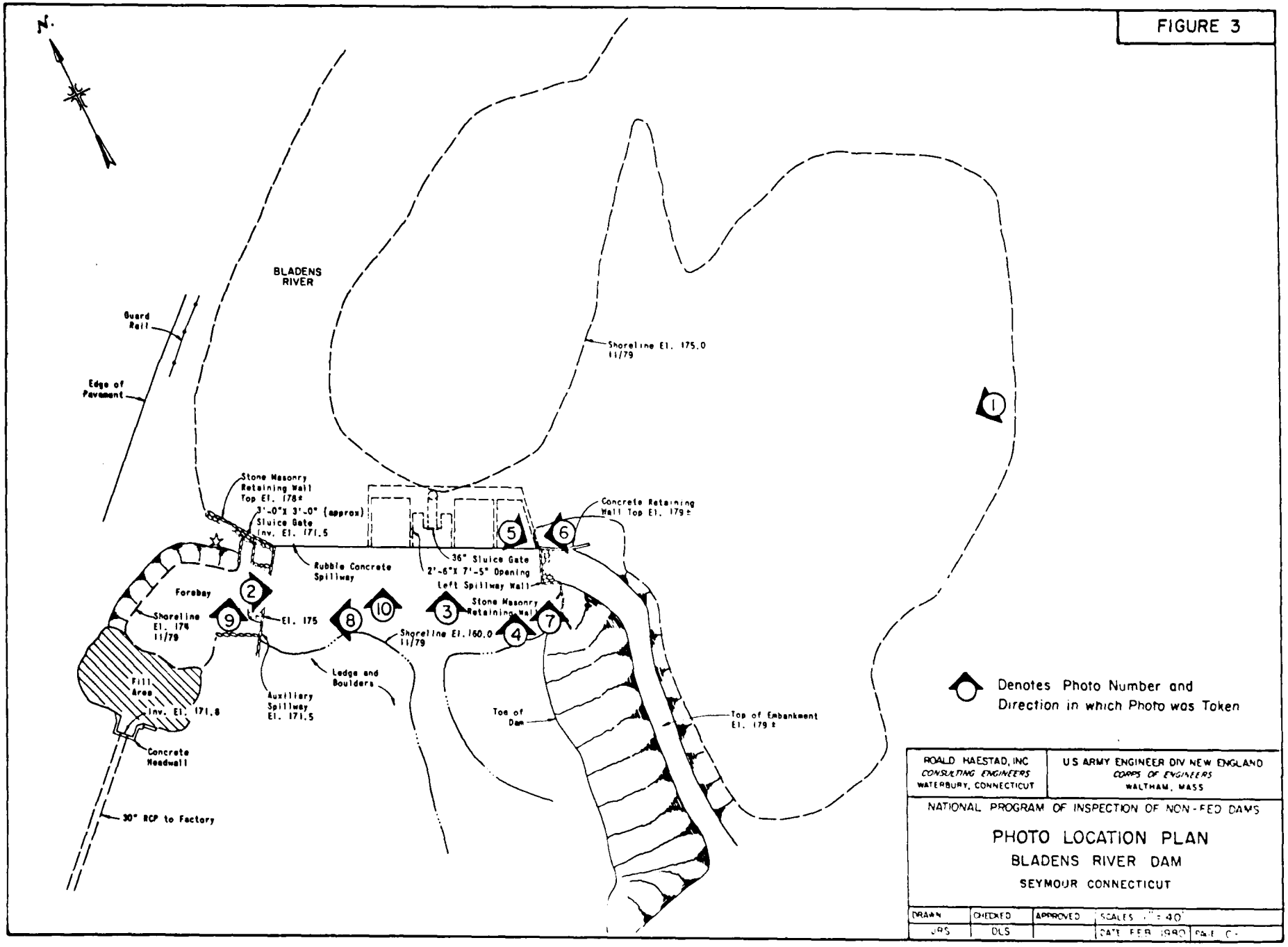
Robert E. [illegible]
Water Resources Unit

RES:lja

APPENDIX C

PHOTOGRAPHS

FIGURE 3



ROALD HAESTAD, INC CONSULTING ENGINEERS WATERBURY, CONNECTICUT	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

PHOTO LOCATION PLAN

BLADENS RIVER DAM

SEYMOUR CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALES 1" = 40'
JRS	DLS		DATE FEB 1980 SHEET C-1

C-1

PHOTO NO. 1

UPSTREAM SLOPE OF EARTH EMBANKMENT
SECTION (LEFT OF PHOTO)

PHOTO NO. 2*

SPILLWAY SECTION. NOTE DETERIORATION
OF CREST AND DOWNSTREAM FACE OF GRAVITY SECTION.

*9 SEPT '79

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 29 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 3

LOW LEVEL OUTLET OR BLOWOFF IN AMBURSEN-TYPE BUTTRESS SECTION. NOTE CONCRETE DETERIORATION

PHOTO NO. 4

DETERIORATED CONCRETE AT LEFT END OF AMBURSEN-TYPE BUTTRESS SECTION. NOTE EXPOSED REINFORCING STEEL

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 9 SEPT '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 5

WATER FLOWING AROUND LEFT END OF SPILLWAY WALL. NOTE HOW UP-STREAM CONCRETE FACE ON WALL HAS BEEN ADDED TO MASONRY WALL

PHOTO NO. 6

UPSTREAM WALL ADJACENT TO LEFT SPILLWAY WALL AND SPILLWAY CREST. NOTE UN-UNDERMINING OF UPSTREAM WALL

U.S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 29 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 7

LEFT SPILLWAY WALL FROM DOWNSTREAM. NOTE VERTICAL CRACK IN MASONRY WALL AND TILTING OF WALL.

PHOTO NO. 8

RIGHT SPILLWAY WALL DOWNSTREAM OF MAIN SPILLWAY, INCLUDING AUXILIARY SPILLWAY FROM FOREBAY.

U.S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 29 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

PHOTO NO. 9

FOREBAY INLET CHANNEL FROM DOWNSTREAM
NOTE MISSING AND DETERIORATED MORTAR IN
MASONRY WALLS AND TREES GROWING FROM DOWNSTREAM
END OF RIGHT WALL. (LEFT SIDE OF PHOTO)

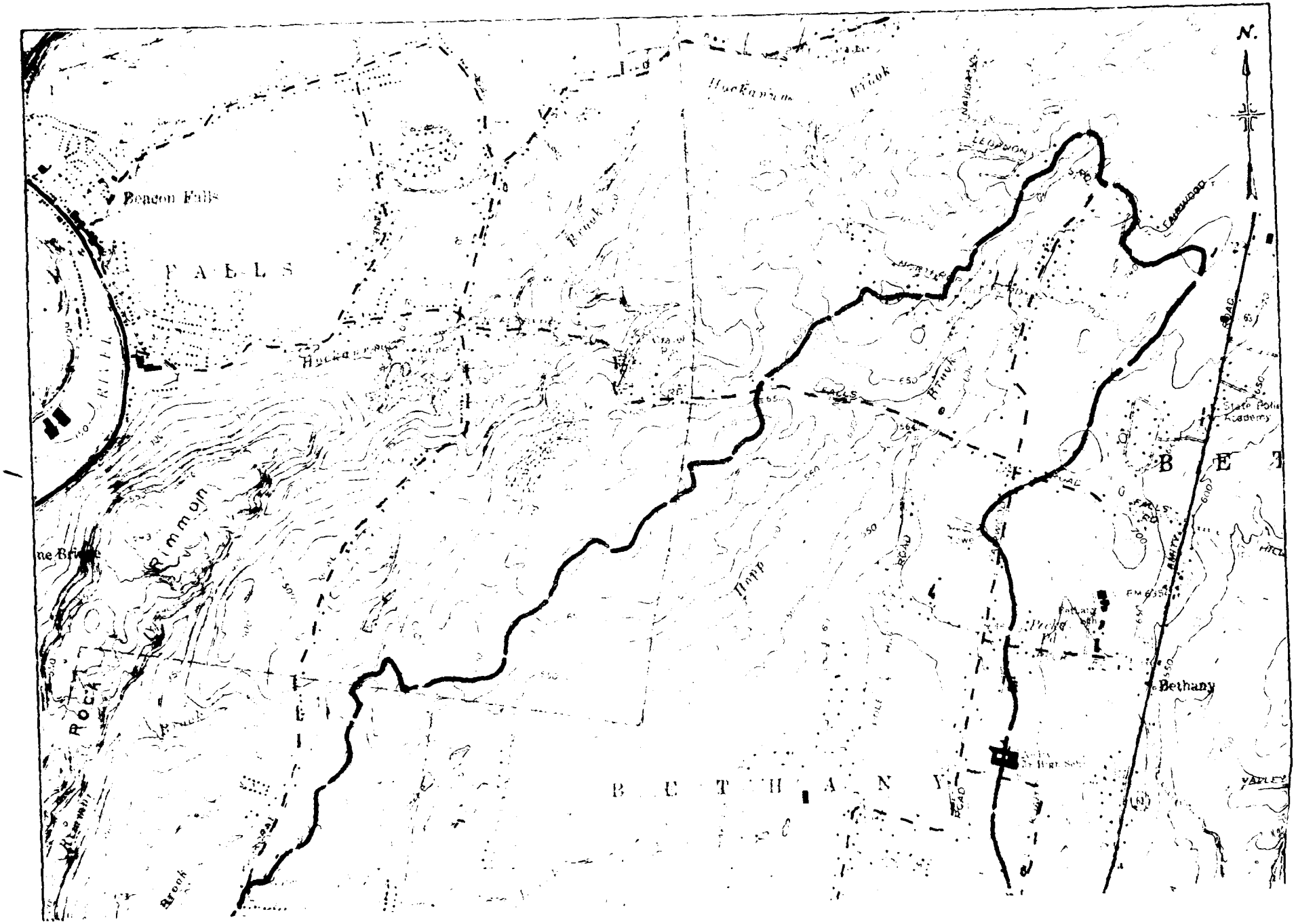
PHOTO NO. 10

RIGHT END OF AMBURSEN-TYPE
BUTTRESS SECTION. NOTE BEDROCK OUTCROP.

U S ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASSACHUSETTS	NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS	BLADENS RIVER DAM BLADENS RIVER SEYMOUR, CONNECTICUT CT 00602 29 NOV '79
ROALD HAESTAD, INC. CONSULTING ENGINEERS WATERBURY, CONNECTICUT		

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS


N.
Beacon Falls
FALLS
Bethany
BETHANY

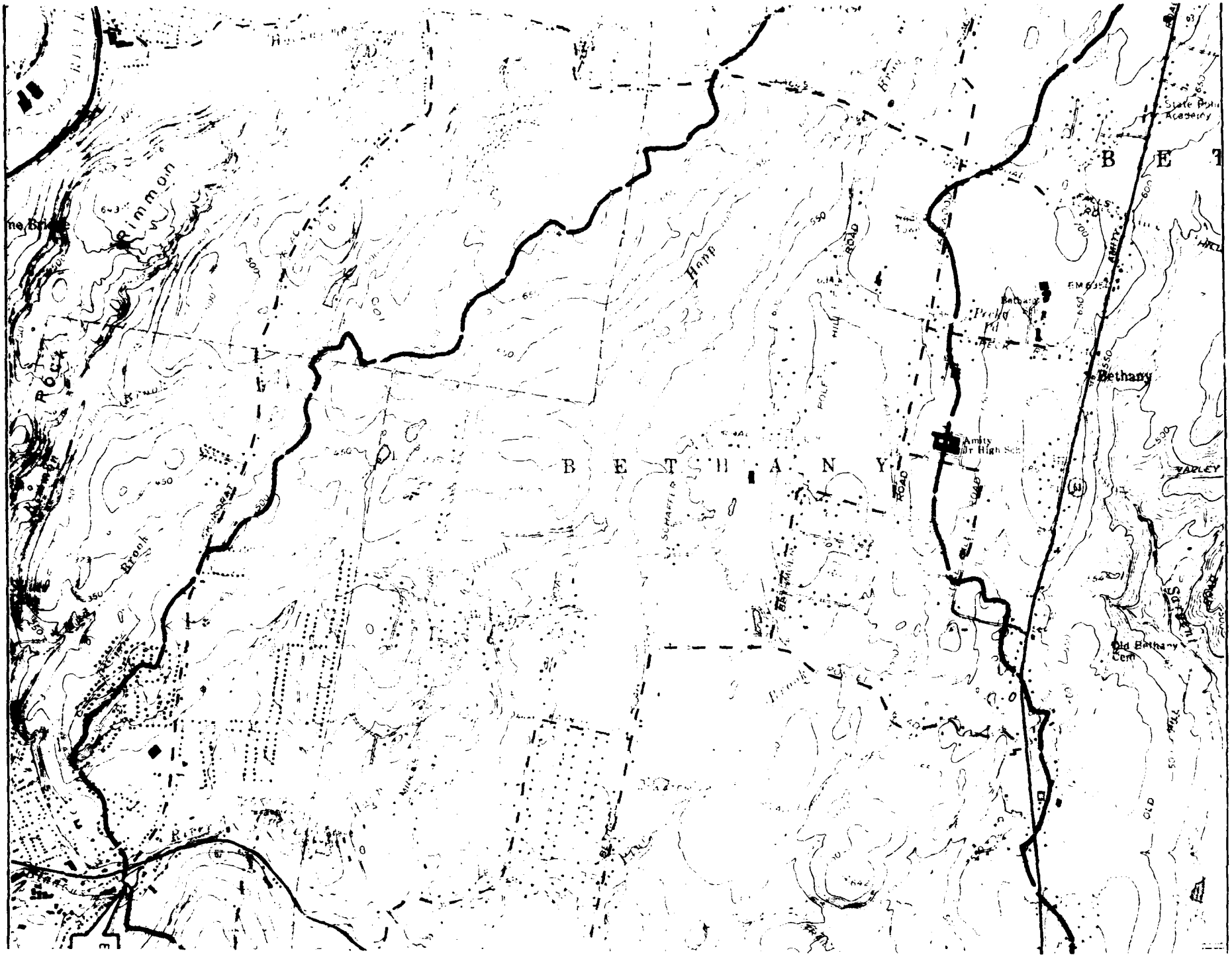
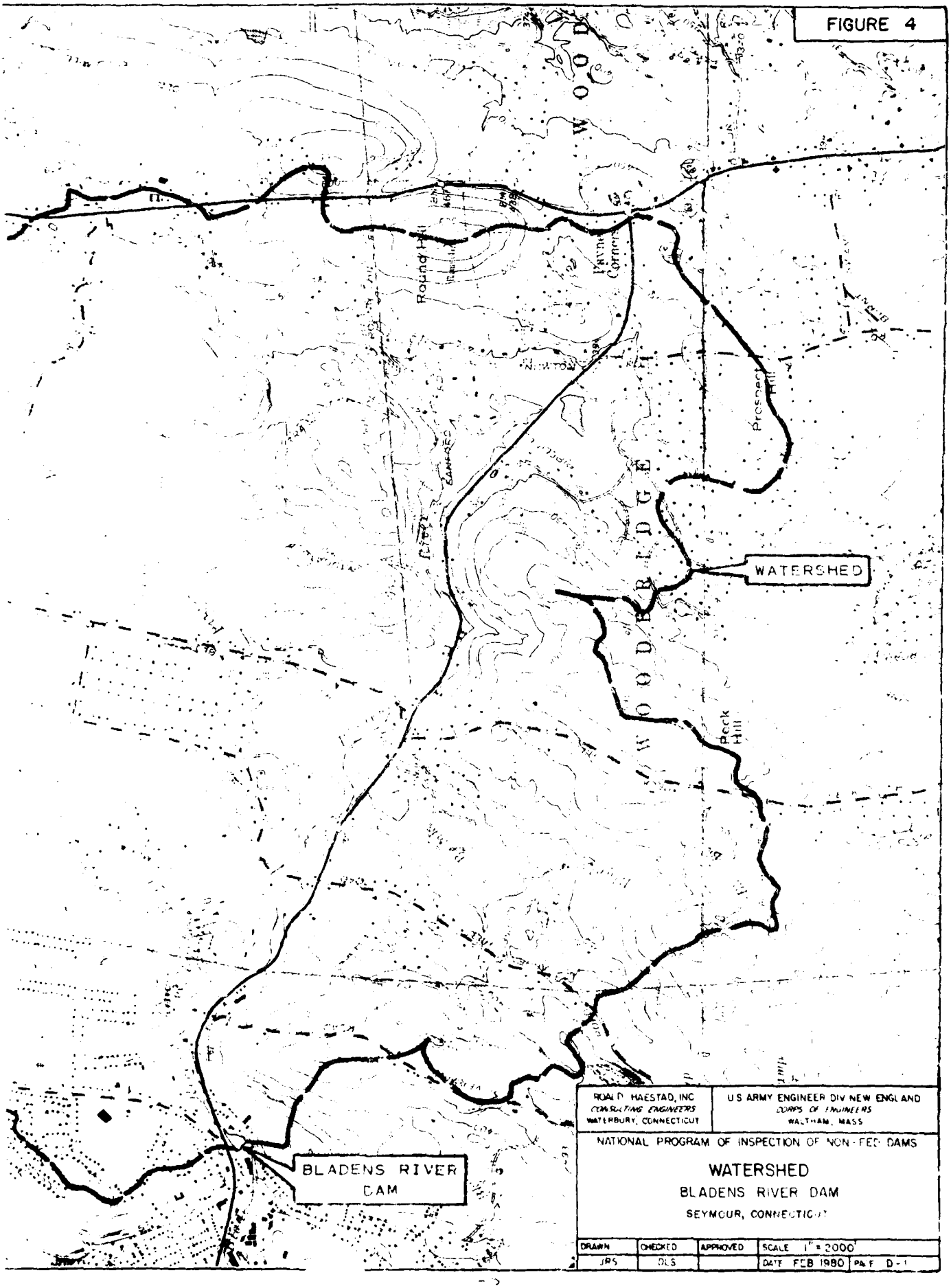

B E T H A N Y
Bethany
Rimmon
ROCK
Brook
Hamp
ROAD
Amity Jr High Sch
Old Bethany Cem
State Police Academy
AMITY
YALEY
SOUTH
OLD

FIGURE 4



ROALD HAESTAD, INC
CONSULTING ENGINEERS
WATERBURY, CONNECTICUT

U.S. ARMY ENGINEER DIV NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

WATERSHED
BLADENS RIVER DAM
SEYMOUR, CONNECTICUT

DRAWN	CHECKED	APPROVED	SCALE 1" = 2000'
JRS	DLS		DATE FEB 1980 PAGE D-1

BY S.L. DATE 1/21/80 **ROALD HAESTAD, INC.** SHEET NO 1 OF 15

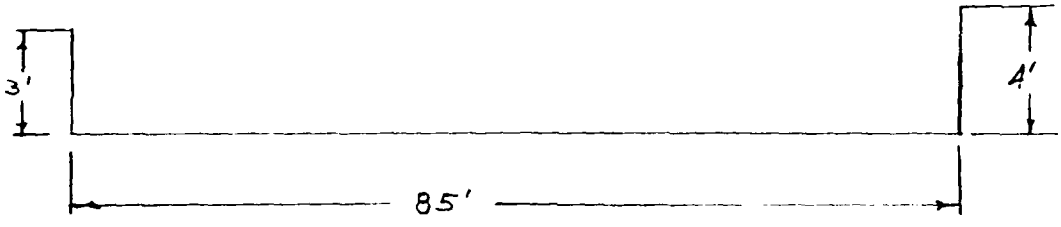
CONSULTING ENGINEERS

CKD BY D.L.S. DATE 2/8/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Spillway Capacity

Spillway Elevation = 175.0 Coeff @ Spillway = 2.8

" Length = 85 ft



FREEBOARD = 2.5 ft (low point on embankment)

Spillway Capacity = $CLH^{3/2} = 2.8(85)(2.5)^{3/2}$

= 941 cfs

Section	Length	Coeff	Elev.	
①	85	2.8	175.0	Main Spillway
②	173	2.7	178.6	OVER ROAD
③	114	2.7	179.2	LEFT EMBANKMENT
④	143	2.7	180.0	RIGHT EMBANKMENT

BY S.L. DATE 1/21/80 **ROALD HAESTAD, INC.** SHEET NO 2 OF 15

CONSULTING ENGINEERS

CKD BY D.L.S. DATE 2/8/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Spillway Capacity

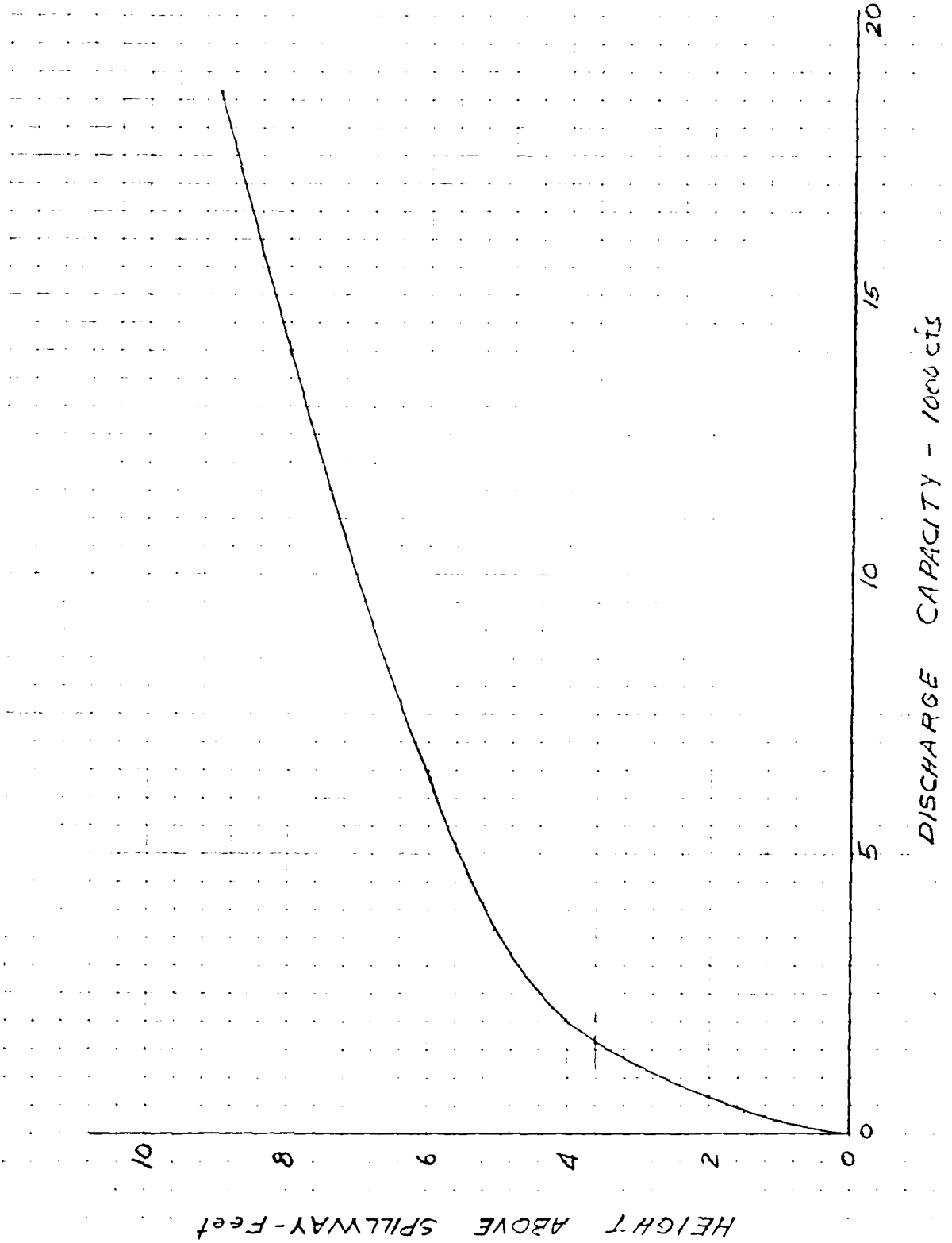
Elev	Sect ①	Sect ②	Sect ③	Sect ④	TOTAL FLOW - cfs
175	0	0	0	0	0
176	238	0	0	0	238
177	673	0	0	0	673
178	1,237	0	0	0	1,237
178.6	1,626	0	0	0	1,626
179.2	2,049	217	0	0	2,266
180	2,661	774	220	0	3,655
181	3,498	1,737	743	386	6,364
182	4,408	2,928	1,442	1,092	9,870
183	5,385	4,311	2,280	2,006	13,982
184	6,426	5,861	3,237	3,089	18,613

BY SL DATE 1/21/80 **ROALD HAESTAD, INC.** SHEET NO 3 OF 15

CONSULTING ENGINEERS

CKD BY DLS DATE 2/8/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Spillway Capacity Curve



BY SL DATE 1/21/80 **ROALD HAESTAD, INC.** SHEET NO 4 OF 15
CONSULTING ENGINEERS
CKD BY RLS DATE 1/31/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10
SUBJECT BLADENS RIVER DAM - Test Flood - ½ PMF

Test flood = ½ PMF

Drainage Area = 6,464 acres = 10.1 sq. mi.

Using the Corps of Eng. chart for "ROLLING" Terrain

M.P.F. = 1,650 cfs/sq mi.

P.M.F. = 1,650 cfs/sq mi × (10.1 sq mi) = 16,665 cfs

½ PMF = ½ (16,665 cfs) = 8,332.5 use 8,335 cfs

Q_{P1} = ½ PMF = 8,335 cfs

H_1 = 6.6 ft from Spillway Capacity Curve

$STOR_1$ = 17.4 acre-ft from Storage-Capacity Curve

= 0.03" of runoff

$Q_{P2} = Q_{P1}(1 - STOR_1/17) = 8,335 \text{ cfs}(1 - 0.03/19) = 8,322 \text{ cfs}$

∴ Bladens River Dam Storage Capacity is negligible

Spillway Capacity = $CLH^{3/2} = 2.8(85)(2.5)^{3/2}$

= 941 cfs

% of ½ PMF = 941/8,335 = 11% of ½ PMF

S = Reservoir Storage at time of failure = Storage at Spillway Level + Freeboard Storage

S = Surface Area x (Average depth + Freeboard)

S = 1.26 acres x (10 ft + 3 ft)

S = 16.38 acre-ft use 16 acre-ft

Q_{P1} = Peak Failure Outflow = $\frac{8}{27} W_b \sqrt{g}\, Y_o^{3/2}$

W_b = Breach Width - 40% of dam length across river at mid height = 0.4(220) = 88 ft

Y_o = Total height from river bed to pool level at failure = 20 ft

$Q_{P1} = \frac{8}{27}(88)\sqrt{32.2}\,(20)^{3/2} = 13,233.7$ use 13,235 cfs

SECTION NO 1 (SEE FIGURE 5) Reach Length = 400 ft

Q_{P1} = 13,235 cfs

H_1 = 16.2 ft A_1 = 575 sq ft

$V_1 = A_1 \times \text{Length} = (575\ ft^2 \times 400\ ft) \times \frac{1\ ac\text{-}ft}{43,560\ ft^3} = 5.28$ use 5 ac-ft

V_1 is less than 1/2 of S ∴ reach is O.K.

$Q_{P2}(TRIAL) = Q_{P1}(1 - V_1/S) = 13,235\ cfs(1 - 5/16) = 9,017$ cfs

H_2 = 13.8 ft A_2 = 425 sq ft

$V_2 = A_2 \times \text{Length} = (425\ ft^2 \times 400\ ft) \times \frac{1\ ac\text{-}ft}{43,560\ ft^3} = 3.9$ use 4 ac-ft

$V_{ave} = \frac{V_2 + V_1}{2} = \frac{4+5}{2} = 4.5$ ac-ft

$Q_{P2} = Q_{P1}(1 - V_{ave}/S) = 13,235\ cfs(1 - 4.5/16) = 9,513$ cfs

H_2 = 14.2 ft

SECTION NO 2 Reach Length = 400 ft

Q_{p2} = 9,513 cfs

H_2 = 12.8 ft A_2 = 860 sq ft

$V_2 = A_2 \times Length = (860\ ft^2 \times 400\ ft) \times {}^{1\ ac\cdot ft}/_{43,560\ ft^3} = 7.89$ use 8 ac-ft

V_2 is equal to 1/2 of S ∴ reach is O.K.

$Q_{p3}(TRIAL) = Q_{p2}(1 - {}^{V_2}/_{S}) = 9,513\ cfs\ (1 - {}^{8}/_{16}) = 4,757$ cfs

H_3 = 11.2 ft A_3 = 560 sq ft

$V_3 = A_3 \times Length = (560\ ft^2 \times 400\ ft) \times {}^{1\ ac\cdot ft}/_{43,560\ ft^3} = 5.1$ use 5 ac-ft

$V_{ave} = \frac{V_3 + V_2}{2} = \frac{5+8}{2} = 6.5$ ac-ft

$Q_{p3} = Q_{p2}(1 - {}^{V_{ave}}/_{S}) = 9,513\ cfs\ (1 - {}^{6.5}/_{16}) = 5,648$ cfs

H_3 = 11.5 ft

SECTION NO 3: Reach Length = 560 ft

Q_{p3} = 5,648 cfs

H_3 = 12.5 ft A_3 = 560 sq ft

$V_3 = A_3 \times Length = (560\ ft^2 \times 560\ ft) \times {}^{1\ ac\cdot ft}/_{43,560\ ft^3} = 7.19$ use 7 ac-ft

V_3 is less than 1/2 of S ∴ reach is O.K.

$Q_{p4}(TRIAL) = Q_{p3}(1 - {}^{V_3}/_{S}) = 5,648\ cfs\ (1 - {}^{7}/_{16}) = 3,177$ cfs

H_4 = 9.7 ft A_4 = 310 sq ft

$V_4 = A_4 \times Length = (310\ ft^2 \times 560\ ft) \times {}^{1\ ac\cdot ft}/_{43,560\ ft^3} = 3.98$ use 4 ac-ft

$V_{ave} = \frac{V_4 + V_3}{2} = \frac{4+7}{2} = 5.5$ ac-ft

$Q_{p4} = Q_{p3}(1 - {}^{V_{ave}}/_{S}) = 5,648\ cfs\ (1 - {}^{5.5}/_{16}) = 3,707$ cfs H_4 = 10.5 ft

SECTION NO 4 Reach Length = 560 feet

Q_{P4} = 3,707 cfs

H_4 = 10.3 ft A_4 = 330 sq ft

$V_4 = A_4 \times Length = (330\ ft^2 \times 560\ ft) \times 1\ ac\text{-}ft / 43{,}560\ ft^3 = 4.24$ use 4 ac-ft

V_4 is less than 1/2 of S ∴ reach is O.K.

$Q_{P5}(TRIAL) = Q_{P4}(1 - V_4/S) = 3{,}707\ cfs\ (1 - 4/16) = 2{,}780$ cfs

H_5 = 7.7 ft A_5 = 190 sq ft

$V_5 = A_5 \times Length = (190\ ft^2 \times 560\ ft) \times 1\ ac\text{-}ft / 43{,}560\ ft^3 = 2.44$ use 2 ac-ft

$$V_{ave} = \frac{V_5 + V_4}{2} = \frac{2+4}{2} = 3 \text{ ac-ft}$$

$Q_{P5} = Q_{P4}(1 - V_{ave}/S) = 3{,}707\ cfs\ (1 - 3/16) = 3{,}012$ cfs $H = 8'$

SECTION NO 5 (At Spillway)

Q_{P5} = 3,012 cfs

H_5 = 3.9 ft V_5 = 10 ac-ft

$Q_{P6}(TRIAL) = Q_{P5}(1 - V_5/S) = 3{,}012\ cfs\ (1 - 10/16) = 1{,}130$ cfs

H_6 = 2.1 ft V_6 = 5 ac-ft

$$V_{ave} = \frac{V_6 + V_5}{2} = \frac{5+10}{2} = 7.5 \text{ ac-ft}$$

$Q_{P6} = Q_{P5}(1 - V_{ave}/S) = 3{,}012\ cfs\ (1 - 7.5/16) = 1{,}600$ cfs

H_6 = 2.7 ft

SECTION NO 6 Reach Length = 560 ft

$Q_{P6} = 1,600$ cfs

$H_6 = 7.3$ ft $A_6 = 220$ sq ft

$V_6 = A_6 \times Length = (220\ ft^2 \times 560\ ft) \times 1\ ac\text{-}ft/43,560\ ft^3 = 2.83$ use 3 ac. ft

V_6 is less than 1/2 of S ∴ reach is O.K.

$Q_{P7}\ (TRIAL) = Q_{P6}(1 - V_6/S) = 1,600\ cfs\ (1 - 3/16) = 1,300$ cfs

$H_7 = 6.2$ ft $A_7 = 185$ sq ft

$V_7 = A_7 \times Length = (185\ ft^2 \times 560\ ft) \times 1\ ac\text{-}ft/43,560\ ft^3 = 2.38$ use 2 ac-ft

$$V_{ave} = \frac{V_7 + V_6}{2} = \frac{2+3}{2} = 2.5\ ac\text{-}ft$$

$Q_{P7} = Q_{P6}(1 - V_{ave}/S) = 1,600\ cfs\ (1 - 2.5/16) = 1,350$ cfs

$H_7 = 6.4$ ft

SECTION NO 7 Reach Length = 700 ft

$Q_{P7} = 1,350$ cfs

$H_7 = 6.4$ ft $A_7 = 195$ sq ft

$V_7 = A_7 \times Length = (195\ ft^2 \times 700\ ft) \times 1\ ac\text{-}ft/43,560\ ft^3 = 3.13$ use 3 ac-ft

$Q_{P8}\ (TRIAL) = Q_{P7}(1 - V_7/S) = 1,350\ cfs\ (1 - 3/16) = 1,097$ cfs

$H_8 = 5.6$ ft $A_8 = 170$ sq ft

$V_8 = A_8 \times Length = (170\ ft^2 \times 700\ ft) \times 1\ ac\text{-}ft/43,560\ ft^3 = 2.73$ use 3 ac-ft

$$V_{ave} = \frac{V_8 + V_7}{2} = \frac{3+3}{2} = 3\ ac\text{-}ft$$

$Q_{P8} = Q_{P7}(1 - V_{ave}/S) = 1,350\ cfs\ (1 - 3/16) = 1,097$ cfs

$H_8 = 5.6$ ft

BY SL DATE 2/4/80 **ROALD HAESTAD, INC.** SHEET NO 9 OF 15

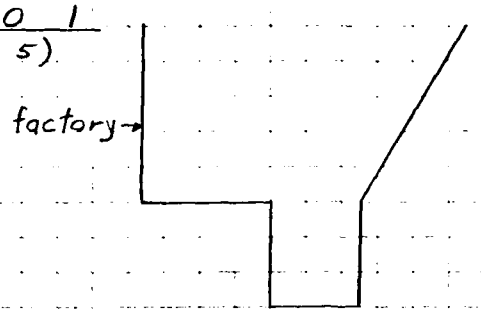
CONSULTING ENGINEERS

CKD BY DHS DATE 2/6/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Flood Routing

SECTION NO 1

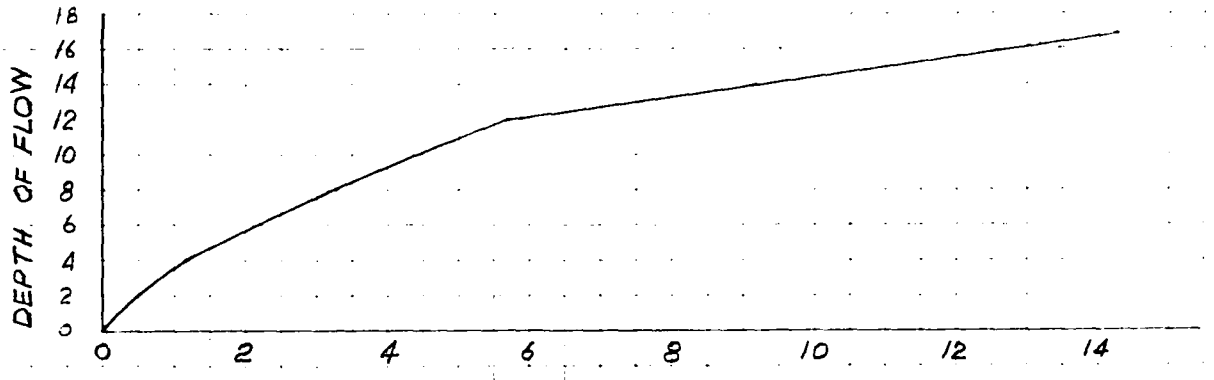
(SEE FIGURE 5)

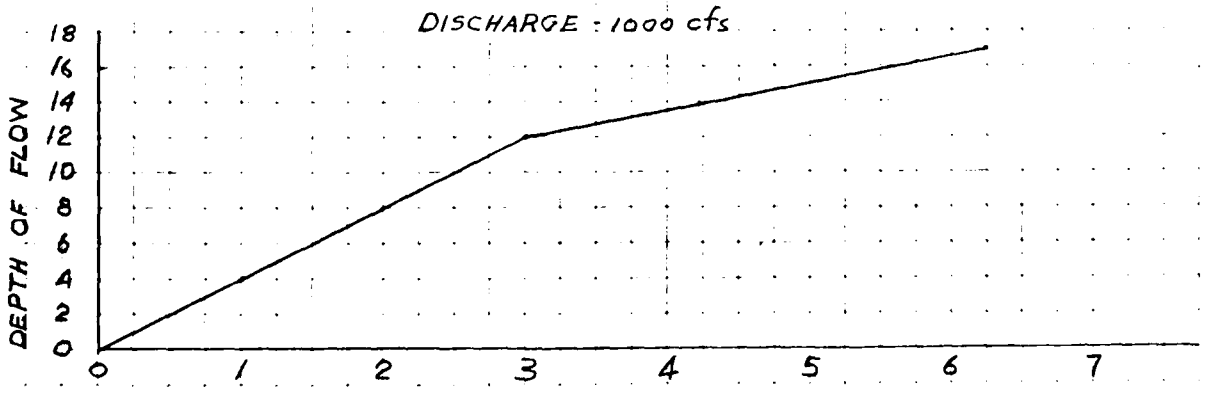


Scale: 1" = 50 Horiz
1" = 20 Vert

L = 400 ft
S = 0.035
h = 0.05

D	W_p	A	R	S	V	Q
4	33	100	3.03	0.035	11.7	1,170
8	41	200	4.89	0.035	16.1	3,220
12	49	300	6.12	0.035	18.7	5610
17	74	620	8.38	0.035	23.0	14,260





BY S.L. DATE 2/5/80 **ROALD HAESTAD, INC.** SHEET NO 10 OF 15

CONSULTING ENGINEERS

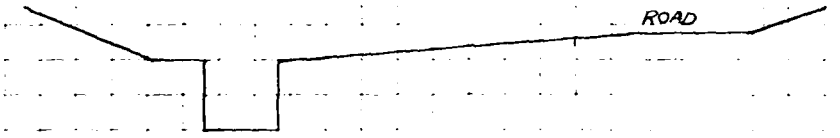
CKD BY D.L.S. DATE 2/6/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Flood Routing

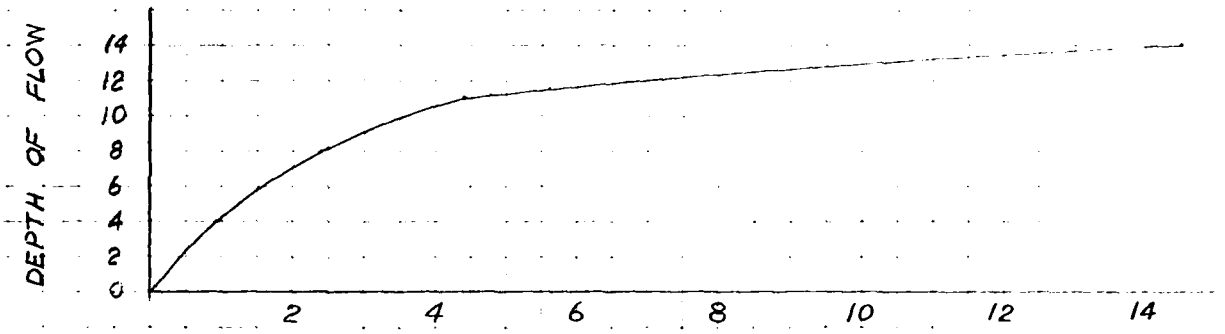
SECTION NO 2

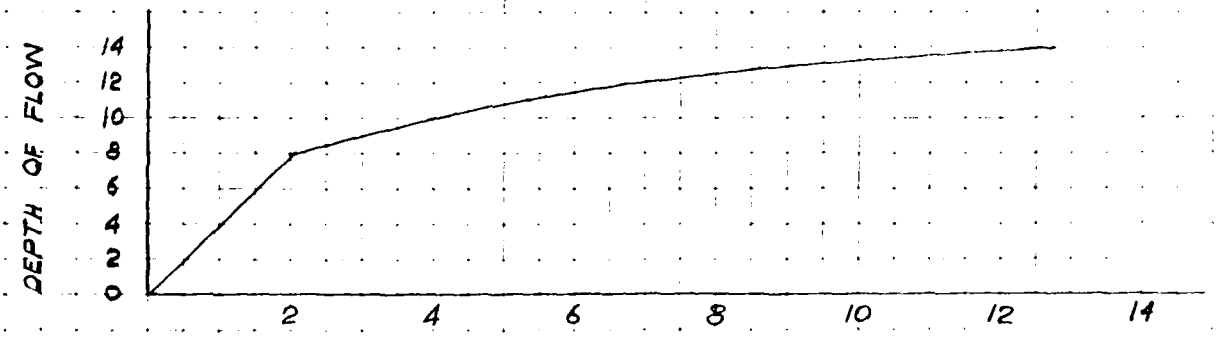
Scale 1" = 60' Horiz
1" = 20' Vert

L = 400 ft
S = 0.02
n = 0.05



D	Wp	A	R	S	V	Q
4	33	100	3.03	0.02	8.8	880
8	41	200	4.89	0.02	12.1	2,420
11	198	535	2.70	0.02	8.2	4,387
14	285	1,272	4.46	0.02	11.4	14,500





BY SL DATE 2/5/80 **ROALD HAESTAD, INC.** SHEET NO 11 OF 15

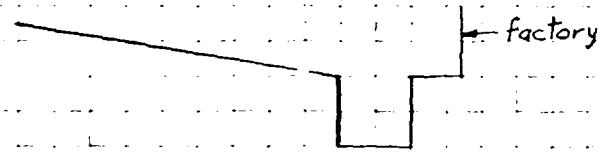
CONSULTING ENGINEERS

CKD BY DLS DATE 2/6/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Flood Routing

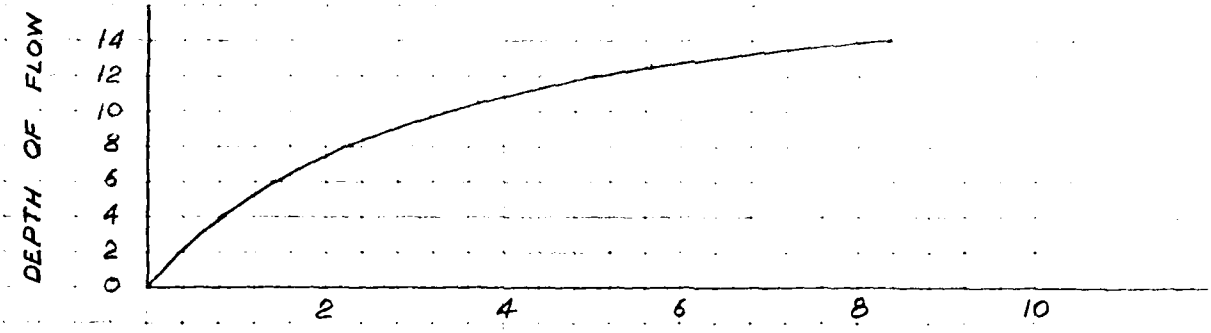
SECTION NO 3

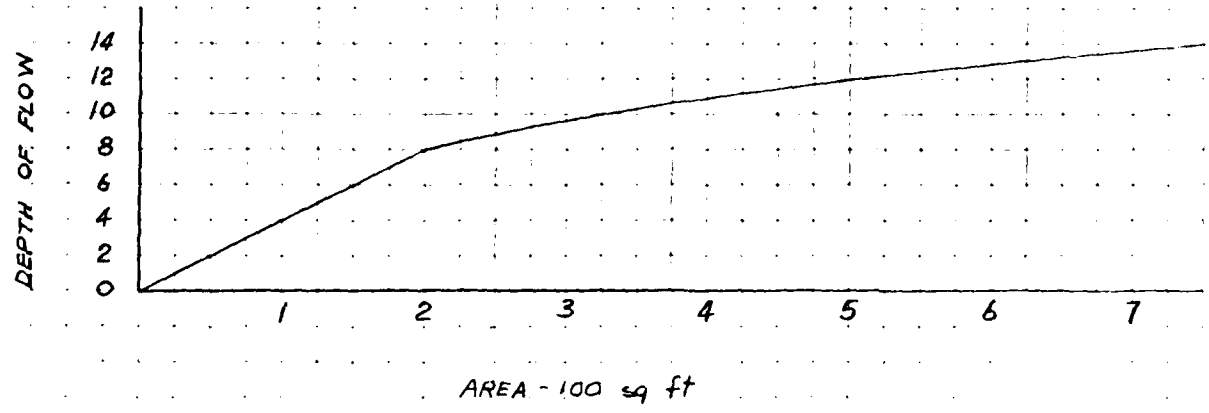
Scale 1"=60' Horiz
1"=20' Vert



L = 560 feet
s = 0.018
n = 0.05

D	Wp	A	R	S	V	Q
4	3.3	100	3.03	0.018	8.4	840
8	4.1	200	4.89	0.018	11.5	2,300
12	13.3	512	3.85	0.018	9.8	5,018
14	17.1	766	4.48	0.018	10.9	8,349





BY S.L. DATE 2/5/80 **ROALD HAESTAD, INC.** SHEET NO 12 OF 15

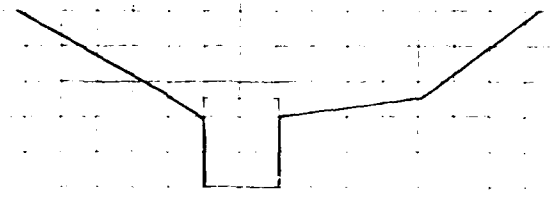
CONSULTING ENGINEERS

CKD BY D.L.S. DATE 2/6/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Flood Routing

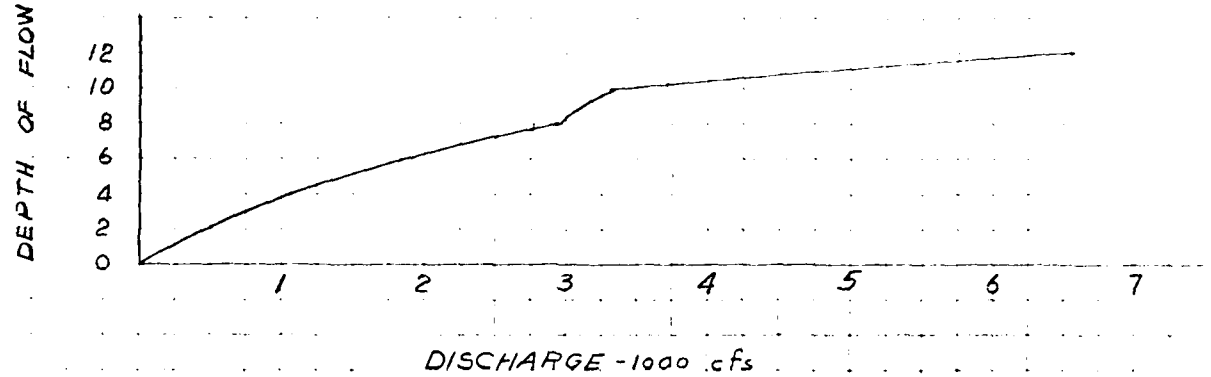
SECTION NO 4

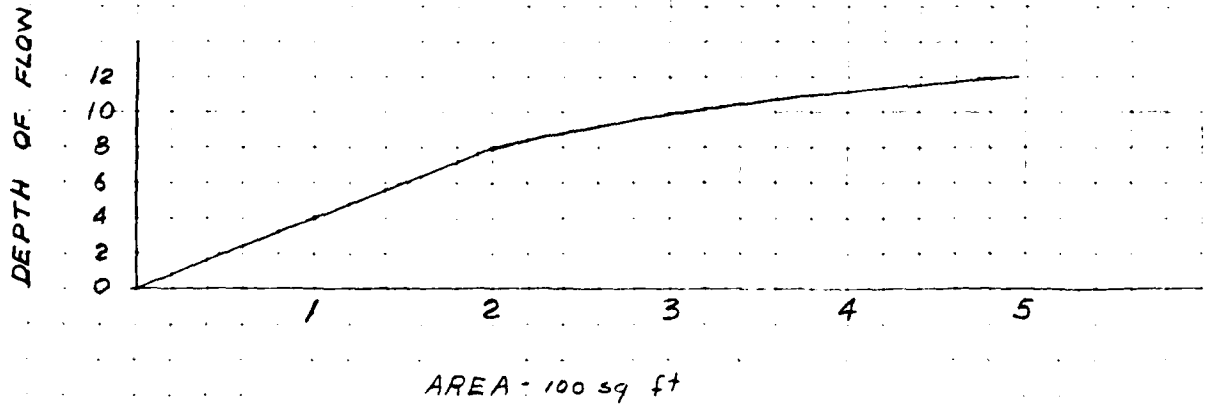
Scale: 1" = 60' Horiz
1" = 20' Vert



L = 560
S = 0.029
n = 0.05

D	W_p	A	R	S	V	Q
4	33	100	3.03	0.029	10.6	1,060
8	41	200	4.89	0.029	14.6	2,920
10	101	310	3.07	0.029	10.7	3,317
12	117	494	4.22	0.029	13.3	6,570

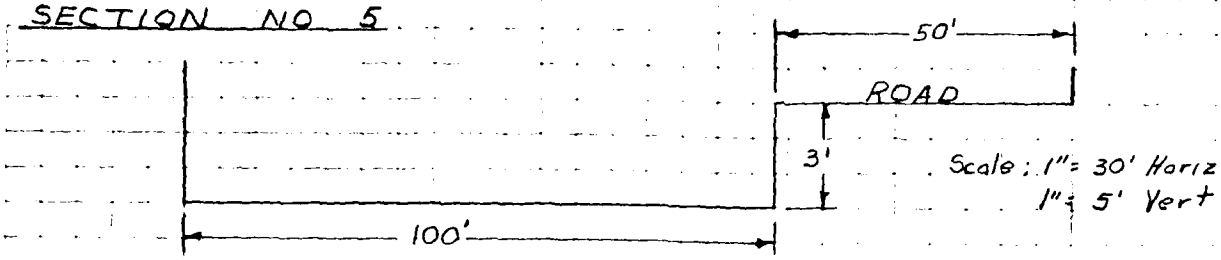




ROALD HAESTAD, INC.
CONSULTING ENGINEERS
37 Brookside Road - Waterbury, Conn. 06708

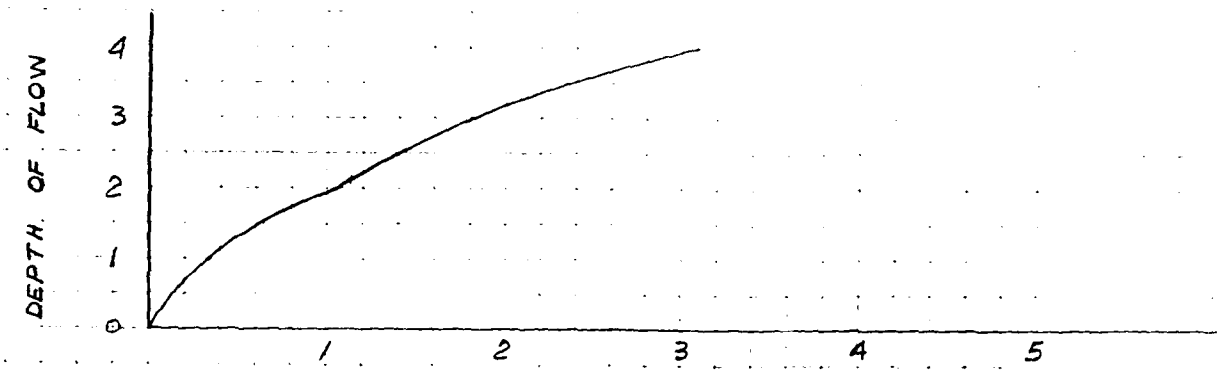
SUBJECT BLADENS RIVER DAM: Flood Routing

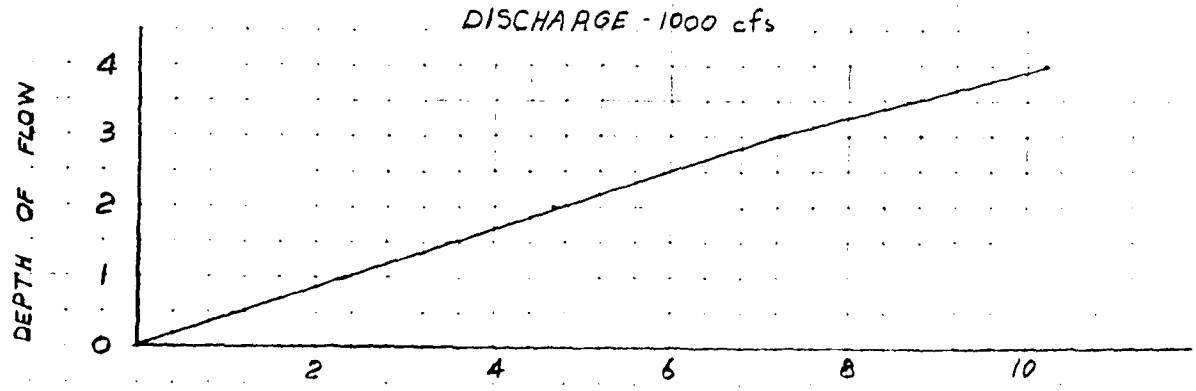
SECTION NO 5



Coeff @ Road = 2.7
Coeff @ Spillway = 3.7
Surface Area = 2.41 acres (Assumed Constant)

Height Above Spillway (ft)	Main Spillway (cfs)	Road (cfs)	Total Flow (cfs)	Storage Capacity acre-feet
1	370	0	370	2.41
2	1,047	0	1,047	4.82
3	1,923	0	1,923	7.23
4	2,960	135	3,095	10.21





BY SL DATE 2/5/80 **ROALD HAESTAD, INC.** SHEET NO 14 OF 15

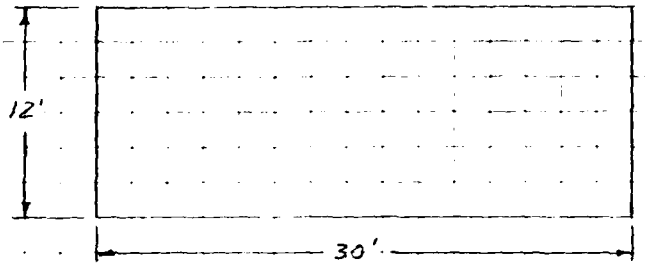
CONSULTING ENGINEERS

CKD BY DLS DATE 2/5/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

SUBJECT BLADENS RIVER DAM - Flood Routing

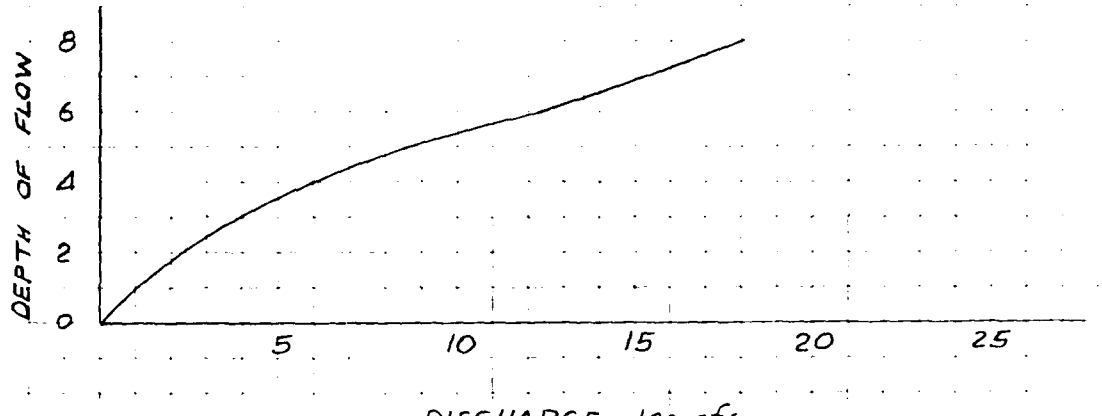
SECTION NO 6

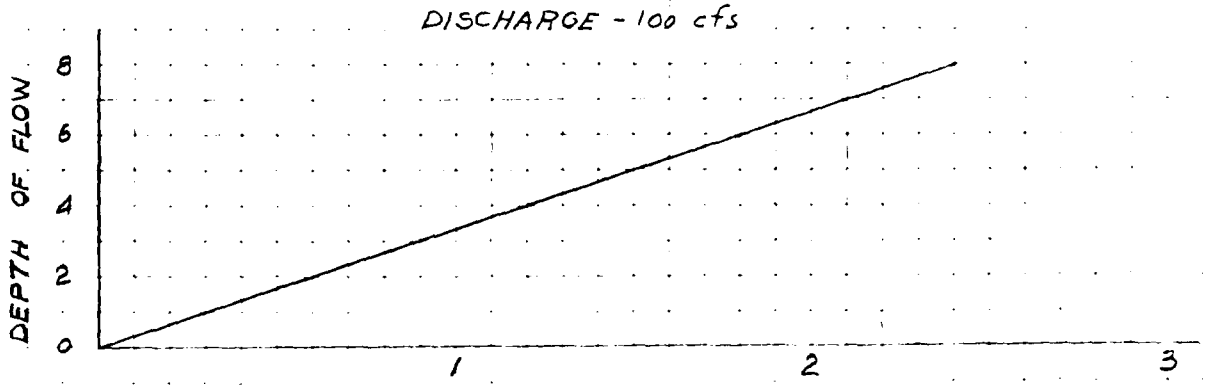
Scale: 1" = 10' Horiz
1" = 10' Vert



Concrete Culvert

HW (ft)	HW/D (ft/ft)	Q/B (cfs/ft)	B (ft)	Q (cfs)	Area (ft²)
4	0.33	20	30	600	120
6	0.50	38	30	1,140	180
8	0.67	60	30	1,800	240





BY SL DATE 2/5/80 **ROALD HAESTAD, INC.** SHEET NO 15 OF 15

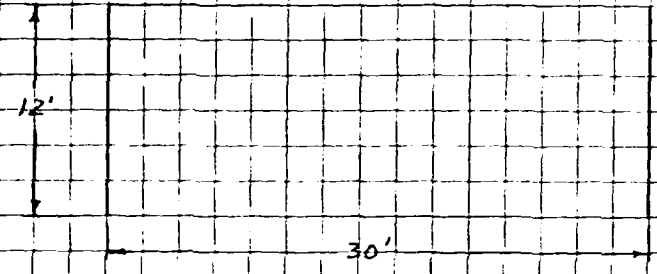
CONSULTING ENGINEERS

CKD BY DLS DATE 2/5/80 37 Brookside Road - Waterbury, Conn. 06708 JOB NO 049-10

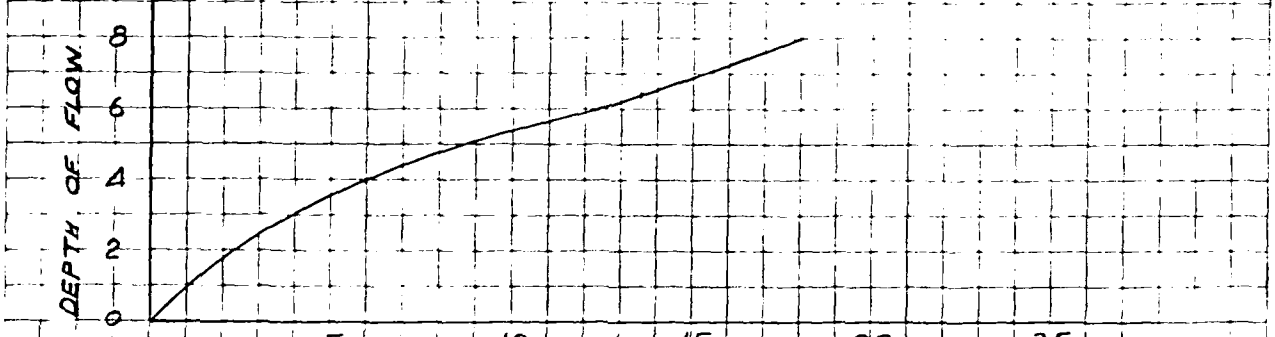
SUBJECT BLADENS RIVER DAM - Flood Routing

SECTION NO 7

Scale: 1" = 10' Horiz
1" = 10' Vert



HW (ft)	HW/D (ft/ft)	Q/B (cfs/ft)	B (ft)	Q (cfs)	Area (ft²)
4	0.33	2.0	30	600	120
6	0.50	3.8	30	1,140	180
8	0.67	6.0	30	1,800	240



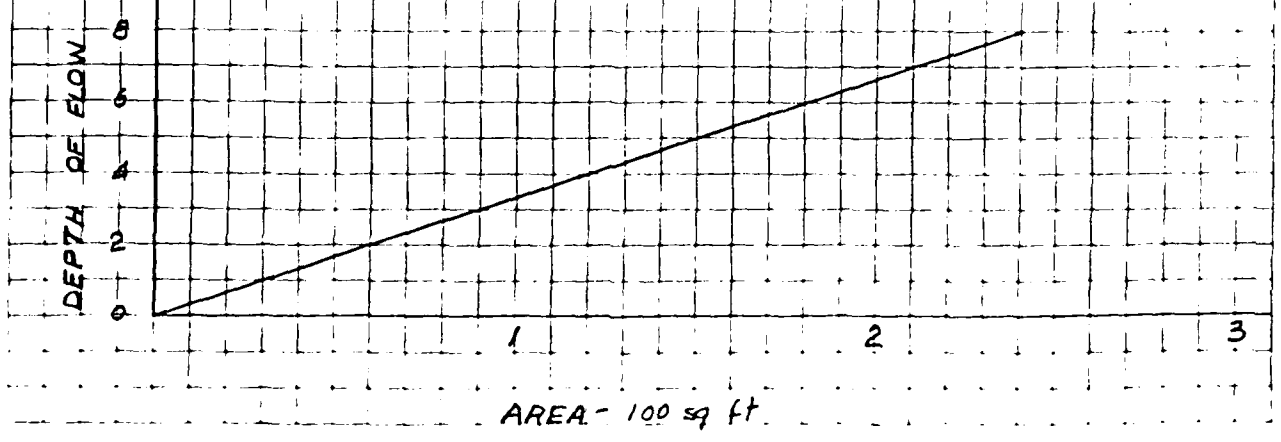
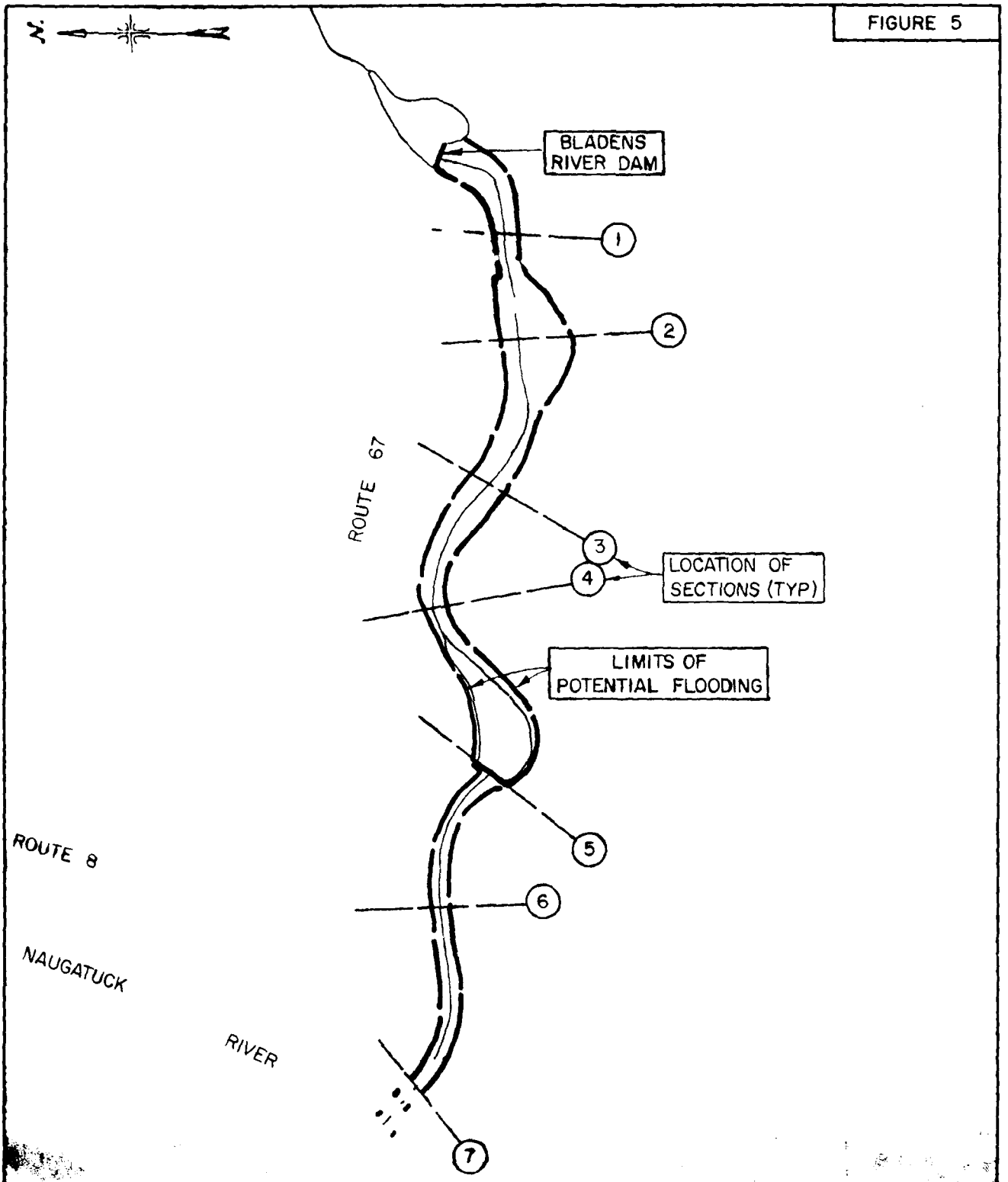


FIGURE 5



LIMITS OF POTENTIAL FLOODING

BLADENS RIVER DAM
SEYMOUR, CONNECTICUT

SCALE: 1" = 500'

ROALD HAESTAD, INC.

NAUGATUCK QUADRANGLE 1972

APPENDIX E

INFORMATION AS CONTAINED IN

THE NATIONAL INVENTORY OF DAMS

NOT AVAILABLE AT THIS TIME


ATE
LME